



CITY OF AUBURN
Department of Public Works

**CONTRACT DOCUMENTS
FOR
2022 SEWER IMPROVEMENTS PROJECT**

NON-MANDATORY PRE-BID MEETING – April 14, 10:00 am
BID DUE – May 3, 3:00 pm

Mayor: Sandy Amara
Council Members:

Alice Dowdin Calvillo
Daniel Berlant
Rachel Radell-Harris
Matt Spokely

City Manager: John W. Donlevy, Jr.

**CITY OF AUBURN
STATE OF CALIFORNIA**

2022 SEWER IMPROVEMENTS PROJECT

The special provisions contained herein have been prepared by or under the direction of the following Registered Professional Civil Engineer:



Daniel Rich, P.E.
NEXGEN, Inc.
Registered Civil Engineer: #56365
License Expires: 03/31/23

**CITY OF AUBURN
STATE OF CALIFORNIA**

2022 SEWER IMPROVEMENTS PROJECT

**PROJECT MANUAL
BID SET**

MARCH 2022

CITY OF AUBURN, CALIFORNIA



Alan Mitchell, P.E.
City Engineer



Mengil A. Deane
Public Works Manager

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IN THE CITY OF AUBURN, CALIFORNIA

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SECTION A

2022 SEWER IMPROVEMENTS PROJECT IN THE CITY OF AUBURN, CALIFORNIA

NOTICE INVITING SEALED BIDS

NOTICE INVITING SEALED BIDS

A1.01 NOTICE INVITING SEALED BIDS

PUBLIC NOTICE IS HEREBY GIVEN that the City of Auburn as AGENCY, invites sealed bids for the CITY OF AUBURN 2022 SEWER IMPROVEMENTS PROJECT and will receive such bids in the office of the City Clerk, 1225 Lincoln Way, Room 8, Auburn, CA 95603 up to the hour of 3:00 p.m., on the 3rd day of May, 2022 at which time bids will be opened in the Auburn City Hall Council Chambers. No phones are available at the City offices for use by the bidders. The clock in the City Clerk's Office will be the final determination of the time. Late submittals will be returned to the bidder unopened.

A1.02 BID OPENING

The bids will be publicly opened and read at 3:00 p.m. on the 3rd day of May, 2022 in the Auburn City Hall Council Chambers.

A1.03 DESCRIPTION OF PROJECT

The City of Auburn is proposing a series of miscellaneous sewer improvement projects throughout the City's wastewater collection system to rehabilitate existing sewer lines and manholes. The proposed 2022 Sewer Improvements Project involves replacing existing Vitrified Clay Pipe (VCP) sewer lines with SDR 26 PVC, rehabilitating existing manholes, realigning existing sewer lines, and lining existing sewer lines with Cured In Place Pipe liner (CIPP liner). This project is intended to remediate existing problem areas within the City's collection system and decrease the number and frequency of Sanitary Sewer Overflows (SSOs).

The Agency's estimated cost of the improvements is \$ 650,000.

A1.04 OBTAINING CONTRACT DOCUMENTS

Contract documents are available for downloading free of charge through the Virtual Project Manager services of CIPList.com. You must sign up to use this service which will automatically inform you of updates and amendments. Plans and specifications are available for download at <http://www.ciplist.com/plans/>. Sign up or sign in to download the project documents including bidder's list etc.

A1.05 CONTRACTOR LICENSE

In accordance with the provisions of California Public Contract Code § 3300, and Business and Professions Code § 7028.15(e), the Agency has determined that the contractor shall possess a valid Class A contractor's license at the time that the contract is awarded. Failure to possess the specified license shall render a bidder's bid as non-responsive and shall bar award of the contract to any bidder not possessing the specified license at the time of the award.

CONTRACTORS ARE REQUIRED BY LAW TO BE LICENSED AND REGULATED BY THE CONTRACTORS' STATE LICENSE BOARD. ANY QUESTIONS CONCERNING A CONTRACTOR MAY BE REFERRED TO THE REGISTRAR, CONTRACTORS' STATE LICENSE BOARD, P.O. BOX 2600, SACRAMENTO, CA 95826. At the time the contract is awarded, the contractor shall be properly licensed in accordance with the laws of this state. The first payment for work or material shall not be made unless and until the Registrar of Contractors verifies to the Agency that the records of the Contractors' State License Board indicate that the contractor was properly licensed at the time the contract was awarded. Any bidder or contractor not so licensed shall be subject to all legal penalties imposed by law including, but not limited to, any appropriate disciplinary action by the Contractors' State Board. Failure of the bidder to obtain proper and adequate licensing for an award of a contract shall constitute a failure to execute the contract and shall result in the forfeiture of the security of the bidder. (Public Contract Code § 20103.5)

CONTRACTORS AND SUBCONTRACTORS ARE ALSO REQUIRED TO BE REGISTERED WITH THE CALIFORNIA DEPARTMENT OF INDUSTRIAL RELATIONS FOR ANY BID PROPOSAL SUBMITTED ON OR AFTER MARCH 1, 2015, AND FOR ANY CONTRACT FOR PUBLIC WORK ENTERED INTO ON OR AFTER APRIL 1, 2015. A contractor or subcontractor shall not be qualified to bid on, be listed on a bid proposal for, or perform any public work contract unless it is currently registered with the California Department of Industrial Relations as described in Labor Code § 1725.5.

A1.06 SUBMISSION OF BIDS

Bids must be prepared on the approved bid forms in conformance with INSTRUCTIONS TO BIDDERS and submitted in the envelopes provided, sealed and plainly marked on the outside:

“SEALED BID FOR CITY OF AUBURN **2022 SEWER IMPROVEMENTS**

CITY OF AUBURN PUBLIC WORKS DEPT

DO NOT OPEN WITH REGULAR MAIL”

A1.07 PRE-BID CONFERENCE

A Non-Mandatory Pre-Bid Conference is scheduled for April 14th at 10:00 am. Pre-bid conference will be located at City Hall, Council Chambers (1225 Lincoln Way, Auburn, CA 95603)

A1.08 BID BONDS

The bid must be accompanied by a bid guarantee in the amount of 10% of the total bid by 3:00 p.m. ON THE DATE ADVERTISED FOR THE OPENING OF BIDS.

More specifically, pursuant to Public Contract Code §§ 20170 and 20171, all bids for the project shall be presented, under sealed cover and shall be accompanied by one of the following forms of bidder's security in the amount of ten percent (10%) of the bid: (a) cash; (b) a cashier's check made payable to the City of Auburn; (c) a certified check made payable to the City of Auburn; or

(d) a bidder's bond executed by an admitted surety insurer made payable to the City of Auburn. Such security shall be forfeited should the successful bidder to whom the contract is awarded fails to timely execute the contract and to deliver the necessary bonds and insurance certificates as specified in the contract documents.

To the extent applicable, at any time during the term of the Agreement for the proposed project, the successful bidder may, at its own expense, substitute securities equivalent to the amount withheld as retention (or the retained percentage) in accordance with Public Contract Code § 22300.

A1.09 PERFORMANCE AND MAINTENANCE BONDS

Pursuant to California Civil Code § 3247, the Contractor, awarded any contract by a public entity except as provided in subdivision (d) of Section 7103 of the Public Contract Code, involving an expenditure in excess of twenty-five thousand dollars (\$25,000) for any public work shall before entering upon the performance of work, file a payment bond with and approved by the officer or public entity by whom the contract was awarded.

If bid is accepted, Contractor shall agree to furnish the Performance Bond and the Labor and Materials Bond (each to be 100% of the bid amount), the Maintenance Bond (to be 50% of the bid amount) within ten (10) calendar days after written NOTICE OF AWARD of contract. The Labor and Materials Bond shall remain in force until 6 months after the date of recordation of the Notice of Completion. The performance bond shall remain in force until the date of recordation of the Notice of Completion. The maintenance Bond shall remain in force until one (1) year after the date of recordation of the notice of Completion.

The successful Bidder will be required to purchase and maintain insurance as stipulated in SECTION D and Section E of the Contract Documents.

All bonds are to be secured from a surety company acceptable to the Agency and that meets all of the State of California bonding requirements, as defined in Code of Civil Procedure section 995.120, and is authorized by the State of California, and all documents required by Code of Civil Procedure section 995.660, to the extent required by law.

A1.10 LABOR CODE (PREVAILING WAGE)

The Agency has determined that the proposed project is a public works subject to the provisions of Labor Code § 1720 thereby requiring the Contractor to pay the prevailing wage rates for all work performed under the Contract. Accordingly, the proposed project is subject to compliance monitoring and enforcement by the California Department of Industrial Relations.

A1.11 AWARD - OWNER'S RIGHTS

The award shall be made to the lowest responsive, responsible bidder whose Bid complies with the specified requirements. The award of Contract will be made by the City Council. The Contractor shall execute the Contract within ten (10) work days after receipt of the Contract from the Agency.

The Agency reserves the right to reject any and all bids.

A1.12 ESCROW OF BID DOCUMENTS (Not applicable to this project)

The first, second and third low bidders will be required to provide escrow of bid documents as specified in the Instructions to Bidders.

A1.13 DISQUALIFICATION OF BIDDERS

If there is reason to believe that collusion exists among any bidders, none of the bids of the participants in such collusion will be considered and the City may likewise elect to reject all bids received.

A1.14 BRAND OR TRADE NAME

Pursuant to Public Contract Code Section 3400(b) the City may make a finding that designates certain materials, products, things, or services by specific brand or trade name for the statutorily enumerated purposes. As required by Section 3400 (b) the City has made such findings as further described in the Supplemental Conditions. These findings, as well as the materials, products, things, or services and their specific brand or trade names that must be used for the Project may be found in Section F1.6 of the Supplemental Conditions.

A1.15 ADDENDA

The City will not accept written questions beyond April 26TH, 2022 at 5:00 p.m.

A1.16 CITY CONTACTS

If you have any questions, please contact **MENGIL DEANE**, at mdeane@auburn.ca.gov or (530) 823-4211 x145.

BY ORDER OF the City Council of the City of Auburn, California.

SECTION B

2022 SEWER IMPROVEMENTS PROJECT IN THE CITY OF AUBURN, CALIFORNIA

INSTRUCTIONS TO BIDDERS

INFORMATION FOR BIDDERS

INSTRUCTIONS TO BIDDERS

The following forms must be completed and submitted with the Contractor's Bid Proposal or the bid may be considered non-responsive:

1. Bid Proposal
2. Bid Schedule
3. Bid Security in the Form of Bond and Guarantee
4. Bidder Information
5. Experience Statement
6. List of Equipment Manufacturers
7. Designation of Subcontractors
8. Technical Ability and Experience
9. Non-Collusion Affidavit
10. Worker's Compensation Certificate

INFORMATION FOR BIDDERS

1. GENERAL

Each proposal must be submitted on the blank forms furnished herewith and must be presented in a sealed envelope and filed prior to the time and date, and at the place designated in the Notice Inviting Bids. The proposal forms must be completely made out in the manner and form indicated therein, clearly and legibly showing the proposed unit prices in both words and numbers, the extended item totals in numbers, the total bid in both words and numbers, and must be properly signed by the bidder. The bidder's address, telephone number and State Contractor's License number must be included. The City Council reserves the right to reject any bid if all the above information is not furnished.

To be eligible to perform work, the bidder must be a Licensed California State Contractor in good standing prior to beginning work.

2. OPENING OF BIDS

All bid proposals submitted as prescribed in the Notice Inviting Bids will be publicly opened and read immediately after the time set and at the place designated in the Notice Inviting Bids.

3. BID QUOTES AND UNIT PRICE EXTENSIONS

The unit prices and the lump sum prices quoted by the bidder must be entered in numbers in the spaces provided on the Contractor's Bid Proposal form. The City reserves the right to use the extended price to determine the bidder's intention. Similarly, in case there is a discrepancy between the sum total of the extended prices and the total amount bid, unit prices in numbers shall be used to verify extended pricing and the total amount bid. The results shall be considered as representing the bidder's intention, and the bid total shall be corrected.

If a Contractor's Bid Proposal contains discrepancies that make it difficult or impossible to determine the bidder's intention, then such bid may be considered nonresponsive, in which case the bid may be rejected, and bid guarantees returned without further consideration of awarding a contract for the proposed work.

4. SUBCONTRACTORS

The bid proposal shall list all subcontractors who will perform work in excess of ½% of the total bid, or in the case of streets or highways, ½% or \$10,000, whichever is greater. The bid shall clearly state the name, address, contract license number, and portion of work to be performed by each subcontractor. All subcontractors shall be registered with the Department of Industrial Relations pursuant to SB 854.

If the bidder fails to specify a subcontractor for any portion of the work to be performed under the contract in excess of one-half of one percent of the bidder's total bid, or if the bidder specifies more than one subcontractor for the same portion of such work, the bidder agrees to perform that portion himself. The successful bidder shall not, without the written consent of the City either:

- a. Substitute any person, firm or corporation as subcontractor in place of the subcontractor designated in the original bid, or

- b. permit any subcontract to be assigned or transferred or allow it to be performed by anyone other than the original subcontractor listed in the bid.

Bids shall be accompanied by cash, a certified or cashier's check, or an acceptable bidder's bond for an amount not less than ten percent (10%) of the bid, made payable to the City of Auburn. Said check or bond shall be given as a guarantee that the bidder will enter into a contract if awarded the work, and in case of refusal or failure to enter into said contract, the check or bond shall be forfeited to the City.

Before submitting a bid, bidders shall carefully examine the Plans, Specifications, and Contract Documents, and shall visit the site of work so as to fully be informed of all existing conditions and limitations. By submitting a bid, each bidder acknowledges that he is fully informed of existing conditions, and the bid reflects that knowledge.

5. SIGNATURE OF CONTRACTOR

- a. Corporation - Any bids submitted by a corporation must include the name of the corporation, and must be signed by the President and Secretary or Assistant Secretary, and the corporate seal must be affixed. Other persons may sign for the corporation in lieu of the above if a certified copy of a resolution of the corporate board of directors so authorizing them to do so is on file in the City Clerk's Office.
- b. Partnerships - Any bids submitted by a partnership must contain the names of all persons comprising the partnership or co-partnership. The bid must be signed by all partners comprising the partnership unless proof in the form of a certified copy of a certificate of partnership acknowledging the signer to be a general partner is presented to the City Clerk.
- c. Joint Ventures - Any bids submitted by a joint venture must so state that and must be signed by each joint venturer.
- d. Individuals - Any bids submitted by an individual must be signed by that individual unless an up-to-date power of attorney is on file in the City Clerk's Office, in which case the person indicated in the power of attorney may sign for the individual.

The above rules also apply in the case of a fictitious firm name. In addition, however, where the fictitious name is used, it must be so indicated where the signature appears.

6. EXAMINATION OF PLANS, CONTRACT DOCUMENTS, AND PROJECT SITE

The Plans, if any, and Contract Documents are on file and available for inspection in the office of the City Engineer. The Bidders are required to carefully examine the site, Plans, and Contract Documents. The Bidder shall be satisfied as to the character, quality, and quantities of work to be performed, materials to be furnished, and as to the requirements of the proposed contract.

7. INTERPRETATION OF PLANS AND DOCUMENTS

If any person or contractor contemplating submitting a bid for the proposed work is in doubt as to the true meaning of any part of the Plans, Specification, or Contract Documents, or other proposed

documents, or finds discrepancies in, or omissions from the drawings or specifications, a written request may be submitted to the City Engineer for all interpretations or corrections thereof.

The City of Auburn will not be responsible for any other explanations or interpretations or any oral interpretation of the meaning of the Plans, Specification, or Contract Documents. Telephone communications with City staff are not encouraged, but are permitted. However, any such oral communication shall not be binding on the City.

8. ADDENDA

Any Addenda issued during the time of bidding, or for preparation of bids, shall be made a part of the Contract Documents.

9. WITHDRAWAL OF BIDS

Bids may be withdrawn by written or telegraphic request received from bidders prior to the time set for opening of bids. After such time, a bidder may not withdraw its bid until after the expiration of sixty (60) days.

10. RETURN OF PROPOSAL GUARANTIES

Within ten (10) days after the award of the contract, the City of Auburn will return the proposal guaranties, other than Bid Bonds, except any guaranties that have been forfeited.

11. AWARD OF CONTRACT

The award of the contract, if it is awarded, will be to the lowest responsive and responsible bidder complying with the Notice Inviting Bids, Instructions to Bidders, and the Information for Bidders.

12. EXECUTION OF CONTRACT

The Contract Agreement is included in the CONTRACT section of these Contract Documents. These documents should be carefully examined by the Bidder. The contract shall be signed by the successful Bidder, in duplicate, and returned, together with the contract bonds and insurance within ten (10) calendar days of receipt of these documents from the City. No contract shall be binding upon the City until it has been completely executed by the Contractor, approved by the City Attorney, and executed by the City.

Failure to execute a contract and file acceptable bonds and insurance as provided herein within the time limit above may be just cause for the annulment of contract award and the forfeiture of the proposal guarantee. The City will file the Contract Agreement, together with the required certificates and bonds, with the City Clerk after complete execution.

13. BONDS AND INSURANCE

Bid Security must be accompanied by cash, cashier's check, certified check, or surety bond in an amount equal to ten (10) percent of the total amount in the Contractor's Proposal. Checks and bonds shall be made payable to the City of Auburn.

The successful bidder, simultaneously with the execution of the Contract Agreement, will be required to furnish certificates evidencing that the required worker's compensation and liability insurance is in effect. A faithful performance bond in an amount equal to one hundred (100)

percent of the contract price shall be furnished as security for completion of this contract, and a separate payment bond in an amount equal to one hundred (100) percent of the contract price shall be furnished as security for payment of all persons performing labor and furnishing materials in connection with this contract.

14. RETENTION

At the request and expense of the contractor, securities equivalent to the five percent (5%) withheld from progress payments pursuant to the City of Auburn's Standard General Conditions shall be deposited with the City Clerk or a state or federally chartered bank as the escrow agent, who shall pay such monies to the contractor upon satisfactory completion of the contract. Securities eligible for investment shall include those listed in Section 16430 of the Government Code or bank or savings and loan certificates of deposit. The contractor shall be the beneficial owner of any securities substituted for monies withheld and shall receive any interest thereof.

15. NON-COLLUSION AFFIDAVIT

The City shall require all bidders to execute and submit a non-collusion affidavit with the Contractor's Bid Proposal. The City reserves the right to accept the non-collusion affidavit before the award of the contract.

16. SUBSTITUTIONS

Where the specifications or drawings specify any material, product, thing, or service by the brand names, whether or not "or equal" is added, and a bidder wishes to propose the use of another item as being equal, he shall request approval therefore as set forth in Section 4-1.6 of the Specifications.

17. OTHER REQUIREMENTS

The contractor will be required to obtain a City Business License prior to award of the contract.

18. LABOR

Bidders are required to inform themselves fully of the conditions relating to construction and labor under which the work will be performed. Any contract entered into pursuant to this notice will incorporate the provisions of the State Labor Code. Pursuant to the provisions of Section 1773.2 of the Labor Code of the State of California, the minimum prevailing rate of per diem wages for each craft, classification or type of workman needed to execute the contract shall be those determined by the Director of Industrial Relations of the State of California, which are on file at the City Hall, City of Auburn, 1225 Lincoln Way, Auburn, CA 95603, and are available to any interested party on request.

19. FORFEITURE PAYMENTS

The Contract includes damages for delay in the performance of project. Contractor will pay as a forfeiture to the City the following sum: Five Hundred Dollars (\$500.00) for each day's delay beyond the time herein prescribed for finishing

SECTION C

2022 SEWER IMPROVEMENTS PROJECT IN THE CITY OF AUBURN, CALIFORNIA

PROPOSAL INFORMATION AND DOCUMENTS

**CONTRACTORS BID PROPOSAL
BID SCHEDULE
BID BOND
BID GUARANTEE
BIDDER INFORMATION
EXPERIENCE STATEMENT
DESIGNATION OF SUB-CONTRACTORS
NON-COLLUSION AFFIDAVIT
WORKERS COMPENSATION INSURANCE ACKNOWLEDGEMENT
CONSTRUCTION SERVICES AGREEMENT**

CONTRACTOR'S BID PROPOSAL

CITY OF AUBURN
1225 LINCOLN WAY
AUBURN, CALIFORNIA 95603

HONORABLE MAYOR AND
MEMBERS OF THE CITY COUNCIL:

Company _____

Business Address _____

Telephone No. _____ State Contractor's License No. _____

The undersigned declares that careful examination of the location of the proposed work, the Plans, the Specifications, and the Contract Documents has been made and hereby proposes to furnish all labor, materials, equipment, tools, transportation, and services to do all work required and to complete said work within **seventy-five (75) working days** after the commencement date stated in the Notice to Proceed. All work shall be performed on the project named below in accordance with the Plans, Specifications, and Contract Documents, for the unit or lump sum prices set forth in the following schedule:

BID SCHEDULE

HEREBY PROPOSE to furnish all labor, materials, equipment, and transportation, and do all the work required to complete the said work in accordance with the said Plans and Specifications for the following unit prices:

Item No.	Item Description	Est. Qty	Unit	Unit Price	Amount
1	Mobilization, Bonding & Insurance	1	LS	\$	\$
2	Demobilization	1	LS	\$	\$
3	Forresthill Avenue Sewer Replacement				
	Remove & Replace Existing 8" VCP Sewer with New 8" SDR 26	30	LF	\$	\$
	Install 4" Pipe, New Cleanout, & Connection	4	EA	\$	\$
	Install New Flushing Branch	1	EA	\$	\$
	Handling Existing Sewer Flow	1	LS	\$	\$
	Asphalt Pavement Replacement	150	SF	\$	\$
	Sheeting, Shoring, and/or Traffic Plates	1	LS	\$	\$
	Traffic Control	1	LS	\$	\$
	Total Item 3	1	LS	\$	\$
4	Neighbors Lane Sewer Replacement				
	Remove Existing 4" VCP Sewer & Replace with New 6" SDR 26	300	LF	\$	\$
	Install 4" Pipe, New Cleanout, & Connection	4	EA	\$	\$
	Install New Flushing Branch	1	EA	\$	\$
	Asphalt Pavement Replacement	1,100	SF	\$	\$
	Sheeting, Shoring, and/or Traffic Plates	1	LS	\$	\$
	Traffic Control	1	LS	\$	\$
	Total Item 4	1	LS	\$	\$
5	High Street Manhole Repair				
	Pressure Wash Manhole Interior & Prepare Joints	1	LS	\$	\$
	Repoint Joints with Non-Shrink Grout	1	LS	\$	\$
	Confined Space Entry	1	LS	\$	\$
	Total Item 5	1	LS	\$	\$
6	Pacific Avenue Manhole Repair & Pipe Realignment				
	Abandon or Remove Existing Pipe	160	LF	\$	\$
	Install New 6" DIP Sewer Pipe	160	LF	\$	\$
	Install New Manhole Casting	1	EA	\$	\$
	Construct New Manhole Channel	1	LS	\$	\$
	Handling Existing Sewer Flow	1	LS	\$	\$

Item No.	Item Description	Est. Qty	Unit	Unit Price	Amount
	Asphalt Pavement Replacement	750	SF	\$	\$
	Sheeting, Shoring, and/or Traffic Plates	1	LS	\$	\$
	Traffic Control	1	LS	\$	\$
	Total Item 6	1	LS	\$	\$
7	Sacramento Street Sewer Replacement				
	Remove & Replace Existing 10" VCP Sewer with New 10" SDR 26	115	LF	\$	\$
	Install 4" Pipe, Cleanout, & Service Connection	2	EA	\$	\$
	Handling Existing Sewer Flow	1	LS	\$	\$
	Remove & Replace 4" Concrete Sidewalk	520	SF	\$	\$
	Remove & Replace Vertical Curb & Gutter	115	LF	\$	\$
	Asphalt Pavement Replacement	750	SF	\$	\$
	Sheeting, Shoring, and/or Traffic Plates	1	LS	\$	\$
	Traffic Control	1	LS	\$	\$
	Total Item 7	1	LS	\$	\$
8	Forest Court Manhole Repair				
	Pressure Wash Manhole Interior & Prepare Joints	1	LS	\$	\$
	Repoint Joints with Non-Shrink Grout	1	LS	\$	\$
	Repair Manhole Channel	1	LS	\$	\$
	Confined Space Entry	1	LS	\$	\$
	Total Item 8	1	LS	\$	\$
9	Church Road Sewer Replacement				
	Remove & Replace Existing 8" VCP Sewer with New 8" SDR 26	135	LF	\$	\$
	Remove & Replace Existing 8" Sewer Suspended On Existing Bridge	35	LF	\$	\$
	Handling Existing Sewer Flow	1	LS	\$	\$
	Asphalt Pavement Replacement	750	SF	\$	\$
	Sheeting, Shoring, and/or Traffic Plates	1	LS	\$	\$
	Traffic Control	1	LS	\$	\$
	Total Item 9	1	LS	\$	\$
10	Herington Drive Sewer Replacement				
	Remove & Replace 4" VCP with 6" SDR 26	390	LF	\$	\$
	Install 4" Pipe, New Cleanout, & Connection	9	EA	\$	\$
	Install New Flushing Branch	1	EA	\$	\$

Item No.	Item Description	Est. Qty	Unit	Unit Price	Amount
	Handling Existing Sewer Flow	1	LS	\$	\$
	Landscaping, Fencing, & Surface Restoration	1	LS	\$	\$
	Asphalt Pavement Replacement	50	SF	\$	\$
	Sheeting, Shoring, and/or Traffic Plates	1	LS	\$	\$
	Traffic Control	1	LS	\$	\$
	Total Item 10	1	LS	\$	\$
11	Sacramento Street/Forest Court Sewer CIPP				
	Install 12" Cured In Place Liner	1,200	LF	\$	\$
	Handling Existing Sewer Flow	1	LS	\$	\$
	Asphalt Pavement Replacement	100	SF	\$	\$
	Traffic Control	1	LS	\$	\$
	Total Item 11	1	LS	\$	\$
	Total Estimated Construction Cost	\$			

Note: LS = Lump Sum LF = Linear Feet EA = Each
 TN = Ton SF = Square Feet CY = Cubic Yard

In the case of discrepancy between unit prices and totals, unit prices will prevail, and the City will recalculate the Bid total based on the unit prices and estimated quantities. In case of discrepancy between words and figures, words will prevail.

TOTAL PROJECT COST IN FIGURES \$ _____

TOTAL PROJECT COST IN WORDS _____

The undersigned bidder acknowledges receipt of the following addendum issued for the above project. If no addendum has been received, write "none".

List of Addendum Received: _____

Signature of Bidder _____

BID BOND

2022 SEWER IMPROVEMENTS PROJECT IN THE CITY OF AUBURN, CALIFORNIA

KNOW ALL PERSONS BY THESE PRESENTS that Bidder _____, as
PRINCIPAL, and _____, as SURETY, are held and firmly bound unto the City of
Auburn as AGENCY, in the penal sum of _____ dollars
(\$ _____), which is ten percent (10%) of the total amount bid by PRINCIPAL to
AGENCY for the above stated project, for the payment of which sum, PRINCIPAL and SURETY agree to
be bound, jointly and severally, firmly by these presents.

The SURETY, for value received, hereby stipulates and agrees that the obligations of said SURETY and
its BOND shall be in no way impaired or affected by any extension of the time within which the AGENCY
may accept such Bid; and said SURETY does hereby waive notice of any such extension.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH that, whereas PRINCIPAL is about to submit a
bid to AGENCY for the above stated project, if said bid is rejected, or if said bid is accepted and a contract is
awarded and entered into by PRINCIPAL in the manner and time specified, and PRINCIPAL provides the
required payment and performance bonds and insurance coverages to AGENCY, then this obligation shall
be null and void, otherwise it shall remain in full force and effect in favor of AGENCY.

IN WITNESS WHEREOF the parties hereto have set their names, titles, hands, and seals this ____ day of
_____, 2022.

PRINCIPAL*

.....

SURETY*

*Provide BIDDER and SURETY name, address and telephone number and the name, title, address and
telephone number for their authorized representatives. Power of Attorney must be attached.

Subscribed and sworn to this day of....., 2022.

NOTARY PUBLIC _____

(SEAL)

BID GUARANTEE

**2022 SEWER IMPROVEMENTS PROJECT
IN THE CITY OF AUBURN, CALIFORNIA**

Note: The following statement shall be used if other than a bid surety bond accompanies bid.

“Accompanying this proposal is a money order*, certified check*, cashier’s check*, cash*, payable to the of the City of Auburn in the amount of _____ Dollars (\$_____)which is at least ten percent (10%) of the total amount of this bid. The proceeds of this bid guarantee shall become the property of the City of Auburn provided this bid is accepted by said City, through action of its legally constituted contracting authorities, and the undersigned fails to execute a contract and furnish the required bonds and insurance within the stipulated time. Otherwise, the proceeds of this bid guarantee shall be returned to the undersigned.”

NAME OF BIDDER.

MAILING ADDRESS
.....
.....

AUTHORIZED SIGNATURE:

TITLE:.....

DATE :.....

BIDDER INFORMATION

2022 SEWER IMPROVEMENTS PROJECT IN THE CITY OF AUBURN, CALIFORNIA

BIDDER certifies that the following information is true and correct:

Name of Bidder:

Business Address:

Telephone:.....FAX:

E-mail:.....

Contractor's License No.:Date License Issued:.....

License Expiration Date:.....

The following are the names, titles, addresses, and phone numbers of all individuals, firm members, partners, joint venturers, and/or corporate officers having a principal interest in this proposal: (Name / Title / Address / Telephone)

.....
.....
.....
.....

Any voluntary or involuntary bankruptcy judgments against any principal having an interest in this proposal are as follows: (Type of Judgment / Date)

.....
.....
.....
.....

All current and prior DBA's, aliases, and/or fictitious business names for any principal having an interest in this proposal are as follows: (Principal / DBA's / Applicable Dates)

.....
.....
.....

Any YES answered to follwing may constitue disqualification of the bidder.

Prior Disqualification

Has your firm ever been disqualified from performing work for any City, County, Public or Private Contracting entity? Yes / No _____ If yes, provide the following information. (If more than once, use separate sheets):

Date: Entity:

Location:

Reason:

Provide Status and any Supplemental Statement:

.....

.....

.....

Has your firm been reinstated by this entity? Yes / No

Violations of Federal or State Law

A. Has your firm or its officers been assessed any penalties by any agency for noncompliance, violations of Federal or State labor laws and/or business or licensing regulations within the past five (5) years relating to your construction projects?

Yes / No: Federal / State:

If “yes”, identify and describe, (including status):

.....

.....

.....

.....

Have the penalties been paid? Yes / No.....

B. Does your firm or its officers have any ongoing investigations by any AGENCY regarding violations of the State Labor Code, California Business and Professions Code or State Licensing laws?

Yes / No: Codes / Laws: Section / Article:

If “yes”, identify and describe (including status):

.....

.....

I declare under penalty of perjury under the laws of the State of California that all of the representations made in this **BIDDER INFORMATION** are true and correct.

Executed this day of , 2022 at , California

.....
Authorized Representative Signature and Title

EXPERIENCE STATEMENT

2022 SEWER IMPROVEMENTS PROJECT IN THE CITY OF AUBURN, CALIFORNIA

Pursuant to this **BID PROPOSAL**, the following is a record of the Bidder's experience in construction of a type similar in magnitude and character to that contemplated under this contract. Included in this section should be a complete list of references for similar projects in terms of scope of work, value of work, and time constraints. The Contractor must demonstrate that he/she has experience with this type of project and can manage this project effectively. If necessary, additional numbered pages can be attached to this page. The Contractor must be properly licensed to perform the work in this project as determined by the State Contractor's License Board.

Project Title Client:.....

Date:..... Project Value:.....Contact.....Tel #.....

Description:

.....

.....

Subject to Federal Labor Standards: Yes/No.....

Project Title:..... Client:.....

Date:..... Project Value:.....Contact.....Tel #.....

Description:

.....

.....

Subject to Federal Labor Standards: Yes/No.....

EXPERIENCE STATEMENT (continued)

2022 SEWER IMPROVEMENTS PROJECT IN THE CITY OF AUBURN, CALIFORNIA

Project Title Client:.....

Date:..... Project Value:.....Contact.....Tel #.....

Description:

.....

.....

Subject to Federal Labor Standards: Yes/No.....

Project Title:..... Client:.....

Date:..... Project Value:.....Contact.....Tel #.....

Description:

.....

.....

Subject to Federal Labor Standards: Yes/No.....

I declare under penalty of perjury under the laws of the State of California that all of the representations made in this **EXPERIENCE STATEMENT** are true and correct.

Executed this day of, 2022 at, California

.....

Authorized Representative Signature and Title

DESIGNATION OF SUB-CONTRACTORS

As required by State Law, the General Contractor bidding will hereinafter state the subcontractor on the job for each particular trade or subdivision of the work in excess of one-half percent of the total bid price and will state the first name and principal location of mill, ship, plant or office of each. Where no subcontractor is listed for a particular phase of the work, it is understood that the General Contractor will perform the work. No changes or substitutions may be made in these subcontractors except upon the prior approval of the City.

The undersigned certifies that the bids of the following listed subcontractors were used in producing the bid, and that the subcontractors listed will be used for the work for which they bid, subject to the approval of the City Engineer, and in accordance with the applicable provisions of the Specifications for the following Work of Improvements:

Item of Work	% of Total Contract	Subcontractor Name, Address and Telephone Number	Subcontractor License Number	Subcontractor Registration Number

 BIDDER'S NAME

AUTHORIZED SIGNATURE

DATE

NON-COLLUSION AFFIDAVIT

The undersigned declares:

I am the _____ of _____, the party making the foregoing bid. The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or to refrain from bidding. The bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder. All statements contained in the bid are true. The bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, to effectuate a collusive or sham bid, and has not paid, and will not pay, any person or entity for such purpose.

Any person executing this declaration on behalf of a bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the bidder.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on _____ [date], at _____ [city], _____ [state].”

WORKER'S COMPENSATION INSURANCE ACKNOWLEDGEMENT

I am aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this contract. If any class of employees engaged in work under this contract at the site of the Project is not protected under any Worker's Compensation law, Contractor shall provide and shall cause each subcontractor to provide adequate insurance for the protection of employees not otherwise protected. Contractor shall indemnify and hold harmless City for any damage resulting from failure of either Contractor or any subcontractor to take out or maintain such insurance.

Date: _____

Signature

Printed Name

Title

CONSTRUCTION SERVICES AGREEMENT

Providing Payment of Prevailing Wages

(City of Auburn / [Company or Individual])

1. IDENTIFICATION

This CONSTRUCTION SERVICES AGREEMENT (“Agreement”) is entered into by and between the City of Auburn, a California municipal corporation (“City”), and _____, a _____ (“Contractor”).

2. RECITALS

- 2.1. City has determined that it requires the following construction services from a contractor: 2022 SEWER IMPROVEMENTS PROJECT, which consists of replacing existing Vitrified Clay Pipe (VCP), replacing curb and gutter, rehabilitating Sanitary Sewer Manholes (SSMH), Slip-lining existing sewer mains, installing flushing lines, patch-paving, traffic control, and any other work associated with the items listed in the following bid schedule in accordance with Plans and Specifications.
- 2.2. Contractor represents that it is fully qualified to perform such professional services by virtue of its experience and the training, education and expertise of its principals and employees. Contractor further represents that it is willing to accept responsibility for performing such services in accordance with the terms and conditions set forth in this Agreement.

NOW, THEREFORE, for and in consideration of the mutual covenants and conditions herein contained, City and Contractor agree as follows:

3. DEFINITIONS

- 3.1. “Scope of Services”: Such professional services as are set forth in Contractor’s **[enter Contractor’s proposal date]** proposal to City attached hereto as Exhibit A and incorporated herein by this reference.
- 3.2. “City Reference Specifications”: The City’s set of Reference Specifications, including the State of California Department of Transportation Standard Specifications, Standard Plans, and Manual of Traffic Controls, latest edition of each, which are incorporated herein by reference and are hereby accepted as Reference Specifications. These specifications shall provide the technical standards for work as applicable, in the opinion of the Director of Public Works. Copies are available online, or at City Hall.
- 3.3. “Agreement Administrator”: The Agreement Administrator for this project is Mengil Deane, Interim City Public Works Manager. The Agreement Administrator shall be the principal point of contact at the City for this project. All services under this Agreement shall be performed at the request of the Agreement Administrator. The Agreement Administrator will establish the timetable for completion of services and any interim

milestones. City reserves the right to change this designation upon written notice to Contractor

3.4. “Maximum Amount”: The highest total compensation and costs payable to Contractor by City under this Agreement. The Maximum Amount under this Agreement is _____ Dollars (\$_____).

3.5. “Commencement Date”: [date].

3.6. “Termination Date”: [date]

4. TERM

The term of this Agreement shall commence at 12:00 a.m. on the Commencement Date and shall expire at 11:59 p.m. on the Termination Date unless extended by written agreement of the parties or terminated earlier under Section 17 (“Termination”) below. Contractor may request extensions of time to perform the services required hereunder. Such extensions shall be effective if authorized in advance by City in writing and incorporated in written amendments to this agreement.

5. CONTRACTOR’S DUTIES

5.1. Services. Contractor shall perform the services identified in the Scope of Services. City shall have the right to request, in writing, changes in the Scope of Services. Any such changes mutually agreed upon by the parties, and any corresponding increase or decrease in compensation, shall be incorporated by written amendment to this Agreement.

5.2. Coordination with City. In performing services under this Agreement, Contractor shall coordinate all contact with City through its Agreement Administrator.

5.3. Budgetary Notification. Contractor shall notify the Agreement Administrator, in writing, when fees and expenses incurred under this Agreement have reached eighty percent (80%) of the Maximum Amount. Contractor shall concurrently inform the Agreement Administrator, in writing, of Contractor’s estimate of total expenditures required to complete its current assignments before proceeding, when the remaining work on such assignments would exceed the Maximum Amount.

5.4. Business License. Contractor shall obtain and maintain in force a City business license for the duration of this Agreement.

Professional Standards. Contractor shall perform all work to the highest standards of Contractor’s profession and in a manner reasonably satisfactory to City. Contractor shall keep itself fully informed of and in compliance with all local, state, and federal laws, rules, and regulations in any manner affecting the performance of this Agreement,

including all Cal/OSHA requirements, the conflict-of-interest provisions of Government Code § 1090 and the Political Reform Act (Government Code § 81000 et seq.).

- 5.5. Appropriate Personnel.** Contractor has, or will secure at its own expense, all personnel required to perform the services identified in the Scope of Services. All such services shall be performed by Contractor or under its supervision or by subcontractor(s) of Contractor, and all personnel engaged in the work shall be qualified to perform such services. *[Name of Project Manager]* shall be Contractor's project administrator and shall have direct responsibility for management of Contractor's performance under this Agreement. No change shall be made in Contractor's project administrator without City's prior written consent.
- 5.6. Prevailing Wages.** This Agreement is subject to the prevailing wage law as more fully set forth in Section 8 (Labor Code), for all work performed under this Agreement for which the payment of prevailing wages is required under the California Labor Code. In particular, Contractor acknowledges that prevailing wage determinations are available for work performed under this Agreement.
- 5.7. Unauthorized Delay.** In accordance with Government Code 53069.85, and all other applicable law, the Contractor agrees to forfeit and pay City the amount of Five Hundred Dollars (\$500.00) per day for each and every day of unauthorized delay beyond the Termination Date, which shall be deducted from any monies due to Contractor. This payment shall be considered liquidated damages. Contractor agrees that such liquidated damages are reasonable under the circumstances existing at the time of execution of the contract, that such liquidated damages are to compensate City for losses that are difficult to measure, and that such damages are not a penalty.
- 5.8. Unforeseeable Delay.** Contractor shall not be deemed in breach of this Agreement and no forfeiture due to delay shall be made because of any delays in the completion of the Scope of Services due to unforeseeable causes beyond the control and without the fault or negligence of Contractor provided Contractor requests from the Agreement Administrator an extension of time in writing. Unforeseeable causes of delay beyond the control of Contractor shall include acts of God, acts of a public enemy, acts of the government, acts of City, or acts of another contractor in the performance of a contract with City, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and weather, or delays of subcontractors due to such causes, or delays caused by failure of the owner of a utility to provide for removal or relocation of existing utility facilities. Delays caused by actions or negligence of Contractor or its agents, servants, employees, officers, subcontractors, directors, or of any party contracting to perform part of all of the Scope of Services or to supply any equipment or materials shall not be unforeseeable delays. Unforeseeable delays (those beyond Contractor's control) shall not entitle Contractor to any additional compensation beyond the Maximum Amount. The sole recourse of Contractor shall be to seek an extension of time from the Agreement Administrator.

- 5.9. Defective Work.** All work which is defective in its construction or deficient in any of the requirements set by City Reference Specifications shall be remedied or replaced by Contractor in an acceptable manner at its own expense. Defective work shall not entitle Contractor to any additional compensation beyond the Maximum Amount.
- 5.10. Permits and Approvals.** Contractor shall obtain, at its sole cost and expense, all permits and regulatory approvals necessary for Contractor's performance of this Agreement. This includes, but shall not be limited to, professional licenses, encroachment permits and building and safety permits and inspections.
- 5.11. Notification of Organizational Changes.** Contractor shall notify the Agreement Administrator, in writing, of any change in name, ownership or control of Contractor's firm or of any subcontractor. Change of ownership or control of Contractor's firm may require an amendment to this Agreement.
- 5.12. Records.** Contractor shall maintain any and all ledgers, books of account, invoices, vouchers, canceled checks, and other records or documents evidencing or relating to charges for services or expenditures and disbursements charged to City under this Agreement for a minimum of three (3) years, or for any longer period required by law, from the date of final payment to Contractor under this Agreement. All such documents shall be made available for inspection, audit, and/or copying at any time during regular business hours, upon oral or written request of City. In addition, pursuant to Government Code Section 8546.7, if the amount of public funds expended under this Agreement exceeds ten thousand dollars, all such documents and this Agreement shall be subject to the examination and audit of the State Auditor, at the request of City or as part of any audit of City, for a period of three (3) years after final payment under this Agreement.

6. SUBCONTRACTING AND ASSIGNMENT

- 6.1. General Prohibition of Assignment.** This Agreement covers construction services of a specific and unique nature. Except as otherwise provided herein, Contractor shall not assign or transfer its interest in this Agreement or subcontract any services to be performed without amending this Agreement.
- 6.2. Contractor Responsible.** Contractor shall be responsible to City for all services to be performed under this Agreement.
- 6.3. Subcontracting.** Contractor shall not subcontract any portion of the performance contemplated and provided for herein unless (1) such subcontracting is specifically described in the proposal attached hereto or (2) the City provides prior written approval. In any event, Contractor shall supervise all work subcontracted by Contractor in performing the Services and shall be responsible for all work performed by a subcontractor as if Contractor itself had performed such work. The subcontracting of any work shall not relieve Contractor from any of its obligations under this Agreement with respect to the Services. Contractor is obligated to ensure that any and all

subcontractors performing any Services shall be fully insured in all respects and to the same extent as set forth under Section 13, to City's satisfaction.

- 6.4. Compensation for Subcontractors.** Contractor shall be liable and accountable for any and all payments, compensation, and federal and state taxes to all subcontractors performing services under this Agreement. City shall not be liable for any payment, compensation, or federal and state taxes for any subcontractors.

7. COMPENSATION

- 7.1. General.** City agrees to compensate Contractor for the services provided under this Agreement, and Contractor agrees to accept payment, of the Maximum Amount in full satisfaction for such services. Compensation shall not exceed the Maximum Amount. Contractor shall not be reimbursed for any expenses unless provided for in this Agreement or authorized in writing by City in advance.
- 7.2. Retention.** City may retain up to 5% of each payment until project completion. Contractor may at its own expense substitute securities equivalent to the amount withheld as retention (or the retained percentage) in accordance with Public Contract Code 22300. At the request and expense of Contractor, securities equivalent to the amount withheld shall be deposited with City, or with a state or federally chartered bank in this state as the escrow agent, who shall then pay those moneys to City. Upon satisfactory completion of this Agreement, the securities shall be returned to Contractor.
- 7.3. Invoices.** Contractor shall submit to City an invoice, on a monthly basis or as otherwise agreed to by the Agreement Administrator, for services performed pursuant to this Agreement. Each invoice shall identify the Maximum Amount, the services rendered during the billing period, the amount due for the invoice, and the total amount previously invoiced. Contractor shall include a copy of each subcontractor invoice, if any, for which reimbursement is sought in the invoice.
- 7.4. Taxes.** City shall not withhold applicable taxes or other payroll deductions from payments made to Contractor except as otherwise required by law. Contractor shall be solely responsible for calculating, withholding, and paying all taxes.
- 7.5. Disputes.** The parties agree to meet and confer at mutually agreeable times to resolve any disputed amounts contained in an invoice submitted by Contractor.
- 7.6. Additional Work.** Contractor shall not be reimbursed for any expenses incurred for work performed outside the Scope of Services unless prior written approval is given by the City on a time-and-materials basis pursuant to a written change order. Contractor shall not undertake any such work without prior written approval of the City. A written change order may be issued without amendment to this Agreement, so long as such written change order does not cause the Maximum Amount to be exceeded. Contractor

shall only be compensated for such additional work at the rates and costs for labor and materials included in the bid or proposal.

- 7.7. City-Initiated Changes** - City may propose in writing changes to Contractor's work within the Scope of Services described. If Contractor is of the opinion that any proposed change causes an increase or decrease in the cost, or a change in the schedule for performance, of the services, Contractor shall notify City in writing of that fact within five (5) days after receipt of written proposal for changes.
- 7.8. Contractor-Initiated Changes** – Contractor may propose in writing changes to the Scope of Services, upon identifying a condition which may change the Scope of Services as agreed at the time of execution of this Agreement. Contractor must notify the City's Agreement Administrator of any changed conditions upon discovery and before they are disturbed. The Public Works Director shall investigate, and if the Public Works Director determines that the conditions will materially affect costs, will issue a Change Order adjusting the compensation for such portion of the Scope of Services. If the Public Works Director determines that conditions are changed conditions and they will materially affect performance time, the Contractor, upon submitting a written request, will be granted an extension of time. If the Public Works Director determines that the conditions do not justify an adjustment in compensation or time, the Contractor will be notified in writing. This notice will also advise the Contractor of its obligation to notify the Public Works Director in writing if the Contractor disagrees.

When and if City and Contractor reach agreement on any such proposed change and its effect on the cost and time for performance, they shall confirm such agreement in writing as an amendment to this Agreement. Contractor may not cease work or delay progress on the original project pending negotiations over changes, and must continue to diligently complete the project.

Should the Contractor disagree with the decision, it may submit a written notice of potential claim to the Public Works Director before commencing the disputed work. In the event of such a dispute, the Contractor shall not be excused from any scheduled completion date provided by the Contract and shall proceed with all work to be performed under the Contract. However, the Contractor shall retain any and all rights provided by either Contract or law which pertain to the resolution of disputes and protests between the contracting parties.

The Contractor's failure to give notice of changed conditions promptly upon their discovery and before they are disturbed shall constitute a waiver of all claims in connection therewith.

8. LABOR CODE

- 8.1. Prevailing Wage Law.** This Agreement is subject to the requirements of the prevailing wage laws, including, but not limited to, Labor Code Section 1720 et seq., and Labor Code Section 1770 et seq., as well as Code of Regulations, Title 8, Section 16000 et

- seq., which require payment of prevailing wage rates and the performance of other requirements on certain “public works” and “maintenance” projects. Contractor shall defend, indemnify, and hold harmless City, and its officers, employees, agents, and volunteers free and harmless from any claim or liability arising out of failure or alleged failure of Contractor to comply with such prevailing wage laws.
- 8.2. Payment of Prevailing Wages.** Contractor shall pay the prevailing wage rates for all work performed under this Agreement. When any craft or classification is omitted from the general prevailing wage determinations, the Contractor shall pay the wage rate of the craft or classification most closely related to the omitted classification.
- 8.3. Forfeiture.** Contractor shall forfeit as a penalty to City Two Hundred Dollars (\$200.00), or any greater penalty provided in the Labor Code, for each calendar day, or portion thereof, for each worker paid less than the prevailing wage rates for any work done under this Agreement employed in the performance of the Scope of Services by Contractor or by any subcontractor of Contractor in violation of the provisions of the Labor Code. In addition, the difference between such prevailing wage rates and the amount paid to each worker for each calendar day, or portion thereof, for which each worker was paid less than the prevailing wage rate shall be paid to each worker by Contractor.
- 8.4. Apprentices.** Contractor shall comply with the provisions of Labor Code 1777.5 concerning the employment of apprentices on public works projects. Contractor shall be responsible for ensuring compliance by its subcontractors with Labor Code 1777.5.
- 8.5. Payroll Records.** Pursuant to Labor Code 1776, Contractor and any subcontractor(s) shall keep accurate payroll records, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by Contractor in connection with this Agreement. Each payroll record shall contain or be verified by a written declaration that it is made under penalty of perjury, stating both of the following: (1) The information contained in the payroll record is true and correct; and (2) The employer has complied with the requirements of Labor Code 1811 and Labor Code 1815 for any work performed by his or her employees on the public works project. The payroll records shall be certified and shall be available for inspection at all reasonable hours as required by Labor Code 1776.
- 8.6. 8-Hour Work Day.** This Agreement is subject to 8-hour work day and wage and hour penalty laws, including, but not limited to, Labor Code 1810 and Labor Code 1813. Contractor and any subcontractor(s) of Contractor shall strictly adhere to the provisions of the Labor Code regarding 8-hour work day and 40-hour work week requirements, and overtime, Saturday, Sunday, and holiday work. Pursuant to the Labor Code, eight hours’ labor shall constitute a legal day’s work. Work performed by Contractor’s employees in excess of eight hours per day, and 40 hours during any one week, must include compensation for all hours worked in excess of eight hours per day, or 40 hours during any one week, at not less than one and one-half times the basic rate of pay.

Contractor shall forfeit as a penalty to City \$25.00, or any greater penalty set forth in the Labor Code, for each worker employed in the execution of the work by Contractor or by any subcontractor(s) of Contractor, for each calendar day during which such worker is required or permitted to the work more than eight hours in one calendar day or more than 40 hours in any one calendar week in violation of the Labor Code.

- 8.7. Registration with DIR.** Contractor and any subcontractor(s) of Contractor shall comply with the provisions of Labor Code 1771 and Labor Code 1725.5 requiring registration with the Department of Industrial Relations (DIR).

9. PUBLIC CONTRACT CODE.

- 9.1. Prompt Payment.** This Agreement is subject to the provisions of Article 1.7 (commencing at § 20104.50) of Division 2, Part 3 of the Public Contract Code regarding prompt payment of contractors by local governments. Article 1.7 mandates certain procedures for the payment of undisputed and properly submitted payment requests within 30 days after receipt, for the review of payment requests, for notice to the contractor of improper payment requests, and provides for the payment of interest on progress payment requests which are not timely made in accordance with this Article. This Agreement hereby incorporates the provisions of Article 1.7 as though fully set forth herein.
- 9.2. Public Works Claims.** To the extent applicable, this Agreement is subject to the provisions of Public Contract Code Section 9204, which mandates certain procedures regarding the resolution of public works claims. A summary of these procedures is included in the Specifications. This Agreement is further subject to the provisions of Article 1.5 (commencing at Section 20104) of Division 2, Part 3 of the Public Contract Code regarding the resolution of public works claims of less than \$375,000. Article 1.5 mandates certain procedures for the filing of claims and supporting documentation by the contractor, for the response to such claims by the contracting public agency, for a mandatory meet and confer conference upon the request of the contractor, for mandatory nonbinding mediation in the event litigation is commenced, and for mandatory judicial arbitration if the parties fail to resolve the dispute through mediation. This Agreement hereby incorporates the provisions of Article 1.5 as though fully set forth herein.
- 9.3. Ineligible Subcontractor(s).** This Agreement is further subject to the provisions of Public Contracts Code 6109 which prohibits Contractor from performing work on this project with a subcontractor who is ineligible to perform work on the project pursuant to Labor Code 1777.1 or Labor Code 1777.7.
- 9.4. Assignment of Actions.** Contractor and any and all subcontractors shall offer and agree to assign to City all rights, title, and interest in and to all causes of action it/they may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 4) or under the Cartwright Act (Chapter 2 [commencing with Section 16700] of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant

to this Agreement. This assignment shall be made and become effective at the time City tenders final payment to Contractor, without further acknowledgment by the parties.

10. OWNERSHIP OF WRITTEN PRODUCTS

All reports, documents or other written material, and all electronic files, including computer-aided design files, developed by Consultant in the performance of this Agreement (such written material and electronic files are collectively known as “written products”) shall be and remain the property of City without restriction or limitation upon its use or dissemination by City except as provided by law. Consultant may take and retain copies of such written products as desired, but no such written products shall be the subject of a copyright application by Consultant.

11. RELATIONSHIP OF PARTIES

- 11.1. General.** Contractor is, and shall at all times remain as to City, a wholly independent contractor.
- 11.2. No Agent Authority.** Contractor shall have no power to incur any debt, obligation, or liability on behalf of City or otherwise to act on behalf of City as an agent. Neither City nor any of its agents shall have control over the conduct of Contractor or any of Contractor’s employees, except as set forth in this Agreement. Contractor shall not represent that it is, or that any of its agents or employees are, in any manner employees of City.
- 11.3. Independent Contractor Status.** Under no circumstances shall Contractor or its employees look to the City as an employer. Contractor shall not be entitled to any benefits. City makes no representation as to the effect of this independent contractor relationship on Contractor’s previously earned California Public Employees Retirement System (“CalPERS”) retirement benefits, if any, and Contractor specifically assumes the responsibility for making such a determination. Contractor shall be responsible for all reports and obligations including, but not limited to: social security taxes, income tax withholding, unemployment insurance, disability insurance, and workers’ compensation, and other applicable federal and state taxes.
- 11.4. Indemnification of CalPERS Determination.** In the event that Contractor or any employee, agent, or subcontractor of Contractor providing services under this Agreement claims or is determined by a court of competent jurisdiction or CalPERS to be eligible for enrollment in CalPERS as an employee of the City, Contractor shall indemnify, defend, and hold harmless City for the payment of any employee and/or employer contributions for CalPERS benefits on behalf of Contractor or its employees, agents, or subcontractors, as well as for the payment of any penalties and interest on such contributions, which would otherwise be the responsibility of City.

12. INDEMNIFICATION

- 12.1. Definitions.** For purposes of this Section 12, “Contractor” shall include Contractor, its officers, employees, servants, agents, or subcontractors, or anyone directly or indirectly employed by either Contractor or its subcontractors, in the performance of this Agreement. “City” shall include City, its officers, agents, employees and volunteers.
- 12.2. Contractor to Indemnify City.** To the fullest extent permitted by law, Contractor shall indemnify, hold harmless, and defend City from and against any and all claims, losses, costs or expenses for any personal injury or property damage arising out of or in connection with Contractor’s alleged negligence, recklessness or willful misconduct or other wrongful acts, errors or omissions of Contractor or failure to comply with any provision in this Agreement.
- 12.3. Scope of Indemnity.** Personal injury shall include injury or damage due to death or injury to any person, whether physical, emotional, consequential, or otherwise, Property damage shall include injury to any personal or real property. Contractor shall not be required to indemnify City for such loss or damage as is caused by the sole active negligence or willful misconduct of the City.
- 12.4. Attorneys Fees.** Such costs and expenses shall include reasonable attorneys’ fees for counsel of City’s choice, expert fees and all other costs and fees of litigation. Contractor shall not be entitled to any refund of attorneys’ fees, defense costs or expenses in the event that it is adjudicated to have been non-negligent.
- 12.5. Defense Deposit.** The City may request a deposit for defense costs from Contractor with respect to a claim. If the City requests a defense deposit, Contractor shall provide it within 15 days of the request.
- 12.6. Waiver of Statutory Immunity.** The obligations of Contractor under this Section 12 are not limited by the provisions of any workers’ compensation act or similar act. Contractor expressly waives its statutory immunity under such statutes or laws as to City.
- 12.7. Indemnification by Subcontractors.** Contractor agrees to obtain executed indemnity agreements with provisions identical to those set forth here in this Section 12 from each and every subcontractor or any other person or entity involved in the performance of this Agreement on Contractor’s behalf.
- 12.8. Insurance Not a Substitute.** City does not waive any indemnity rights by accepting any insurance policy or certificate required pursuant to this Agreement. Contractor’s indemnification obligations apply regardless of whether or not any insurance policies are determined to be applicable to the claim, demand, damage, liability, loss, cost or expense.

13. INSURANCE

13.1. Insurance Required. Contractor shall maintain insurance as described in this section and shall require all of its subcontractors, Contractors, and other agents to do the same. Approval of the insurance by the City shall not relieve or decrease any liability of Contractor. Any requirement for insurance to be maintained after completion of the work shall survive this Agreement.

13.2. Documentation of Insurance. City will not execute this agreement until it has received a complete set of all required documentation of insurance coverage. However, failure to obtain the required documents prior to the work beginning shall not waive the Contractor's obligation to provide them. Contractor shall file with City:

- Certificate of Insurance, indicating companies acceptable to City, with a Best's Rating of no less than A:VII showing. The Certificate of Insurance must include the following reference: 2022 SEWER IMPROVEMENTS PROJECT
- Documentation of Best's rating acceptable to the City.
- Original endorsements effecting coverage for all policies required by this Agreement.
- Complete, certified copies of all required insurance policies, including endorsements affecting the coverage.

13.3. Coverage Amounts. Insurance coverage shall be at least in the following minimum amounts:

- Professional Liability Insurance: \$1,000,000 per occurrence,
\$2,000,000 aggregate
- General Liability:
 - General Aggregate: \$2,000,000
 - Products Comp/Op Aggregate \$2,000,000
 - Personal & Advertising Injury \$1,000,000
 - Each Occurrence \$1,000,000
 - Fire Damage (any one fire) \$ 50,000
 - Medical Expense (any one person) \$ 5,000
- Workers' Compensation:
 - Workers' Compensation Statutory Limits
 - EL Each Accident \$1,000,000
 - EL Disease - Policy Limit \$1,000,000
 - EL Disease - Each Employee \$1,000,000
- Automobile Liability
 - Any vehicle, combined single limit \$1,000,000

Any available insurance proceeds broader than or in excess of the specified minimum insurance coverage requirements or limits shall be available to the additional insured.

- Furthermore, the requirements for coverage and limits shall be the greater of (1) the minimum coverage and limits specified in this Agreement, or (2) the broader coverage and maximum limits of coverage of any insurance policy or proceeds available to the named insured
- 13.4. General Liability Insurance.** Commercial General Liability Insurance shall be no less broad than ISO form CG 00 01. Coverage must be on a standard Occurrence form. Claims-Made, modified, limited or restricted Occurrence forms are not acceptable.
- 13.5. Worker's Compensation Insurance.** Contractor is aware of the provisions of Section 3700 of the Labor Code which requires every employer to carry Workers' Compensation (or to undertake equivalent self-insurance), and Contractor will comply with such provisions before commencing the performance of the work of this Agreement. If such insurance is underwritten by any agency other than the State Compensation Fund, such agency shall be a company authorized to do business in the State of California.
- 13.6. Automobile Liability Insurance.** Covered vehicles shall include owned if any, non-owned, and hired automobiles and, trucks.
- 13.7. Claims-Made Policies.** If any of the required policies provide coverage on a claims-made basis the Retroactive Date must be shown and must be before the date of the contract or the beginning of contract work. Claims-Made Insurance must be maintained and evidence of insurance must be provided for at least five (5) years after completion of the contract of work. If coverage is canceled or non-renewed, and not replaced with another claims-made policy form with a Retroactive Date prior to the contract effective date, the Contractor must purchase "extended reporting" coverage for a minimum of five (5) years after completion of contract work.
- 13.8. Additional Insured Endorsements.** The City, its City Council, Commissions, officers, and employees of Auburn must be endorsed as an additional insured for each policy required herein, for liability arising out of ongoing and completed operations by or on behalf of the Contractor. Contractor's insurance policies shall be primary as respects any claims related to or as the result of the Contractor's work. Any insurance, pooled coverage or self-insurance maintained by the City, its elected or appointed officials, directors, officers, agents, employees, volunteers, or Contractors shall be non-contributory. All endorsements shall be signed by a person authorized by the insurer to bind coverage on its behalf. General liability coverage can be provided using an endorsement to the Contractor's insurance at least as broad as ISO Form CG 20 10 11 85 or both CG 20 10 and CG 20 37.
- 13.9. Failure to Maintain Coverage.** In the event any policy is canceled prior to the completion of the project and the Contractor does not furnish a new certificate of insurance prior to cancellation, City has the right, but not the duty, to obtain the required insurance and deduct the premium(s) from any amounts due the Contractor under this Agreement. Failure of the Contractor to maintain the insurance required by this

Agreement, or to comply with any of the requirements of this section, shall constitute a material breach of this Agreement.

13.10. Notices. Contractor shall provide immediate written notice if (1) any of the required insurance policies is terminated; (2) the limits of any of the required policies are reduced; (3) or the deductible or self-insured retention is increased. Contractor shall provide no less than 30 days' notice of any cancellation or material change to policies required by this Agreement. Contractor shall provide proof that cancelled or expired policies of insurance have been renewed or replaced with other policies providing at least the same coverage. Such proof will be furnished at least two weeks prior to the expiration of the coverages. The name and address for Additional Insured Endorsements, Certificates of Insurance and Notices of Cancellation is: City of Auburn, Attn: Mengil Deane, 1225 Lincoln Way, Auburn, CA 95603.

13.11. Contractor's Insurance Primary. The insurance provided by Contractor, including all endorsements, shall be primary to any coverage available to City. Any insurance or self-insurance maintained by City and/or its officers, employees, agents or volunteers, shall be in excess of Contractor's insurance and shall not contribute with it.

13.12. Waiver of Subrogation. Contractor hereby waives all rights of subrogation against the City. Contractor shall additionally waive such rights either by endorsement to each policy or provide proof of such waiver in the policy itself.

13.13. Report of Claims to City. Contractor shall report to the City, in addition to the Contractor's insurer, any and all insurance claims submitted to Contractor's insurer in connection with the services under this Agreement.

13.14. Premium Payments and Deductibles. Contractor must disclose all deductibles and self-insured retention amounts to the City. The City may require the Contractor to provide proof of ability to pay losses and related investigations, claim administration, and defense expenses within retention amounts. Ultimately, City must approve all such amounts prior to execution of this Agreement.

City has no obligation to pay any premiums, assessments, or deductibles under any policy required in this Agreement. Contractor shall be responsible for all premiums and deductibles in all of Contractor's insurance policies. The amount of deductibles for insurance coverage required herein are subject to City's approval.

13.15. Duty to Defend and Indemnify. Contractor's duties to defend and indemnify City under this Agreement shall not be limited by the foregoing insurance requirements and shall survive the expiration of this Agreement.

14. MUTUAL COOPERATION

- 14.1. City Cooperation in Performance.** City shall provide Contractor with all pertinent data, documents and other requested information as is reasonably available for the proper performance of Contractor's services under this Agreement.
- 14.2. Contractor Cooperation in Defense of Claims.** If any claim or action is brought against City relating to Contractor's performance in connection with this Agreement, Contractor shall render any reasonable assistance that City may require in the defense of that claim or action.

15. NOTICES

Any notices, bills, invoices, or reports required by this Agreement shall be deemed received on: (i) the day of delivery if delivered by hand, facsimile or overnight courier service during Contractor's and City's regular business hours; or (ii) on the third business day following deposit in the United States mail if delivered by mail, postage prepaid, to the addresses listed below (or to such other addresses as the parties may, from time to time, designate in writing).

If to City:

[Name]
City of Auburn
[Department/Division]
1225 Lincoln Way
Auburn, CA 95603
Telephone: (530) 823-4211
Facsimile: (530) 823-4209

If to Contractor:

[Name]
[Address]
[Address]
Telephone:
Facsimile:

With courtesy copy to:

Gary B. Bell, Esq.
Auburn City Attorney
Colantuono, Highsmith & Whatley, PC
420 Sierra College Drive, Suite 140
Grass Valley, CA 95945
Telephone: (530) 432-7357
Facsimile: (530) 432-7356

16. SURVIVING COVENANTS

The parties agree that the covenants contained in Section 5.12 (Records), Section 11.4 (Indemnification of CalPERS Determination), Section 12 (Indemnification), Section 13.7 (Claims-Made Policies), Section 14.2 (Contractor Cooperation in Defense of Claims), and Section 19.1 (Confidentiality) of this Agreement shall survive the expiration or termination of this Agreement, subject to the provisions and limitations of this Agreement and all otherwise applicable statutes of limitations and repose.

17. TERMINATION

- 17.1. City Termination.** City may terminate this Agreement for any reason on five calendar days' written notice to Contractor. Contractor agrees to cease all work under this Agreement on or before the effective date of any notice of termination. All City data, documents, objects, materials or other tangible things shall be returned to City upon the termination or expiration of this Agreement.
- 17.2. Contractor Termination.** Contractor may terminate this Agreement for a material breach of this Agreement upon 30 days' notice.
- 17.3. Compensation Following Termination.** Upon termination, Contractor shall be paid based on the work satisfactorily performed at the time of termination. In no event shall Contractor be entitled to receive more than the amount that would be paid to Contractor for the full performance of the services required by this Agreement. The City shall have the benefit of such work as may have been completed up to the time of such termination.
- 17.4. Remedies.** City retains any and all available legal and equitable remedies for Contractor's breach of this Agreement.

18. INTERPRETATION OF AGREEMENT

- 18.1. Governing Law.** This Agreement shall be governed and construed in accordance with the laws of the State of California.
- 18.2. Integration of Exhibits.** All documents referenced as exhibits in this Agreement are hereby incorporated into this Agreement. In the event of any material discrepancy between the express provisions of this Agreement and the provisions of any document incorporated herein by reference, the provisions of this Agreement shall prevail. This instrument contains the entire Agreement between City and Contractor with respect to the transactions contemplated herein. No other prior oral or written agreements are binding upon the parties. Amendments hereto or deviations herefrom shall be effective and binding only if made in writing and executed on by City and Contractor.
- 18.3. Headings.** The headings and captions appearing at the commencement of the sections hereof, and in any paragraph thereof, are descriptive only and for convenience in reference to this Agreement. Should there be any conflict between such heading, and the section or paragraph thereof at the head of which it appears, the language of the section or paragraph shall control and govern in the construction of this Agreement.
- 18.4. Pronouns.** Masculine or feminine pronouns shall be substituted for the neuter form and vice versa, and the plural shall be substituted for the singular form and vice versa, in any place or places herein in which the context requires such substitution(s).

18.5. Severability. If any term or provision of this Agreement or the application thereof to any person or circumstance shall, to any extent, be invalid or unenforceable, then such term or provision shall be amended to, and solely to the extent necessary to, cure such invalidity or unenforceability, and shall be enforceable in its amended form. In such event, the remainder of this Agreement, or the application of such term or provision to persons or circumstances other than those as to which it is held invalid or unenforceable, shall not be affected, and each term and provision of this Agreement shall be valid and be enforced to the fullest extent permitted by law.

18.6. No Presumption Against Drafter. Each party had an opportunity to consult with an attorney in reviewing and drafting this agreement. Any uncertainty or ambiguity shall not be construed for or against any party based on attribution of drafting to any party.

19. GENERAL PROVISIONS

19.1. Confidentiality. All data, documents, discussion, or other information developed or received by Contractor for performance of this Agreement are deemed confidential and Contractor shall not disclose it without prior written consent by City. City shall grant such consent if disclosure is legally required. All City data shall be returned to City upon the termination or expiration of this Agreement.

19.2. Conflicts of Interest. Contractor maintains and warrants that it has not employed nor retained any company or person, other than a bona fide employee working solely for Contractor, to solicit or secure this Agreement. Further, Contractor warrants that it has not paid nor has it agreed to pay any company or person, other than a bona fide employee working solely for Contractor, any fee, commission, percentage, brokerage fee, gift or other consideration contingent upon or resulting from the award or making of this Agreement. Contractor further agrees to file, or shall cause its employees or subcontractor to file, a Statement of Economic Interest with the City's Filing Officer if required under state law in the performance of the services. For breach or violation of this warranty, City shall have the right to rescind this Agreement without liability. For the term of this Agreement, no member, officer, or employee of City, during the term of his or her service with City, shall have any direct interest in this Agreement, or obtain any present or anticipated material benefit arising therefrom.

19.3. Non-assignment. Contractor shall not delegate, transfer, subcontract or assign its duties or rights hereunder, either in whole or in part, without City's prior written consent, and any attempt to do so shall be void and of no effect. City shall not be obligated or liable under this Agreement to any party other than Contractor.

19.4. Binding on Successors. This Agreement shall be binding on the successors and assigns of the parties.

19.5. No Third-Party Beneficiaries. Except as expressly stated herein, there is no intended third-party beneficiary of any right or obligation assumed by the parties.

- 19.6. Time of the Essence.** Time is of the essence for each and every provision of this Agreement.
- 19.7. Non-Discrimination.** Contractor shall not discriminate against any employee or applicant for employment because of race, sex (including pregnancy, childbirth, or related medical condition), creed, national origin, color, disability as defined by law, disabled veteran status, Vietnam veteran status, religion, age (40 and above), medical condition (cancer-related), marital status, ancestry, or sexual orientation. Employment actions to which this provision applies shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; or in terms, conditions or privileges of employment, and selection for training. Contractor agrees to post in conspicuous places, available to employees and applicants for employment, the provisions of this nondiscrimination clause.
- 19.8. Waiver.** No provision, covenant, or condition of this Agreement shall be deemed to have been waived by City or Contractor unless in writing signed by one authorized to bind the party asserted to have consented to the waiver. The waiver by City or Contractor of any breach of any provision, covenant, or condition of this Agreement shall not be deemed to be a waiver of any subsequent breach of the same or any other provision, covenant, or condition.
- 19.9. Excused Failure to Perform.** Contractor shall not be liable for any failure to perform if Contractor presents acceptable evidence, in City's sole judgment that such failure was due to causes beyond the control and without the fault or negligence of Contractor.
- 19.10. Remedies Non-Exclusive.** Each right, power and remedy provided for herein or now or hereafter existing at law, in equity, by statute, or otherwise shall be cumulative and shall be in addition to every other right, power, or remedy provided for herein or now or hereafter existing at law, in equity, by statute, or otherwise. The exercise, the commencement of the exercise, or the forbearance from the exercise by any party of any one or more of such rights, powers or remedies shall not preclude the simultaneous or later exercise by such party of any or all of such other rights, powers or remedies.
- 19.11. Attorneys' Fees.** If legal action shall be necessary to enforce any term, covenant or condition contained in this Agreement, each party shall pay its own costs, including any accountants' and attorneys' fees expended in the action.
- 19.12. Venue.** The venue for any litigation shall be the Superior Court of California for the County of Placer and Contractor hereby consents to sole jurisdiction in that court for purposes of resolving any dispute or enforcing any obligation arising under this Agreement.

TO EFFECTUATE THIS AGREEMENT, the parties have caused their duly authorized representatives to execute this Agreement on the dates set forth below.

“City”
City of Auburn

“Contractor”
[Name of Company or Individual]

By: _____
Signature

By: _____
Signature

Printed: _____

Printed: _____

Title: _____

Title: _____

Date: _____

Date: _____

Attest:

By: _____
Amy Lind, City Clerk

Date: _____

Approved as to form:

By: _____
Gary B. Bell, City Attorney

Date: _____

SECTION D

2022 SEWER IMPROVEMENTS PROJECT IN THE CITY OF AUBURN, CALIFORNIA

CONTRACT INFORMATION AND DOCUMENTS

**ARTICLES OF AGREEMENT
PAYMENT BOND
FAITHFUL PERFORMANCE BOND
MAINTENANCE BOND
WORKER'S COMPENSATION INSURANCE CERTIFICATE
INSURANCE ENDORSEMENT
STATEMENT REGARDING INSURANCE COVERAGE
STATEMENT REGARDING THE CONTRACTOR'S LICENSING LAWS**

ARTICLES OF AGREEMENT

THIS **2022 SEWER IMPROVEMENTS PROJECT AGREEMENT** (“AGREEMENT”) is made and entered into for the above-stated project this ___th day of ___, 2022 (*Council Action Date Here*), BY AND BETWEEN the City of Auburn, a municipal corporation, hereafter designated as “AGENCY”, and CONTRACTOR’S BUSINESS NAME, a _____ (State) _____ (corporation, partnership, limited liability company, or other business form), hereafter designated as “CONTRACTOR.”

WITNESSETH that AGENCY and CONTRACTOR have mutually agreed as follows:

ARTICLE I: Contract Documents

The contract documents for the **2022 SEWER IMPROVEMENTS PROJECT**, shall consist of the Notice Inviting Sealed Bids, Instructions To Bidders, Bid Proposal, Bid Schedule, Standard Specifications, Special Provisions, and all referenced specifications, details, standard drawings, and appendices; together with two signed copies of the AGREEMENT, two signed copies of required bonds; one copy of the insurance certificates, permits, notices, and affidavits; and also including any and all addenda or supplemental agreements clarifying, amending, or extending the work contemplated as may be required to ensure its completion in an acceptable manner (collectively referred to herein as the “Contract Documents”). All of the provisions of the Contract Documents are made a part hereof as though fully set forth herein.

ARTICLE II: Scope of Work

For and in consideration of the payments and agreements to be made and performed by AGENCY, CONTRACTOR agrees to furnish all materials and equipment and perform all work required for the above-stated project, and to fulfill all other obligations as set forth in the aforesaid contract documents.

AGENCY hereby employs CONTRACTOR to provide the materials, do the work, and fulfill the obligations according to the terms and conditions herein contained and referred to, for the prices provided herein, and hereby contracts to pay the same at the time, in the manner, and upon the conditions set forth in this AGREEMENT.

In entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to this AGREEMENT, CONTRACTOR offers and agrees to assign to the AGENCY all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 (Section 16700, et seq.) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the awarding body tenders final payment to CONTRACTOR, without further acknowledgment by the parties.

ARTICLE III: Compensation

A. CONTRACTOR agrees to receive and accept the prices set forth in the Bid Proposal and Bid Schedule as full compensation for furnishing all materials, performing all work, and fulfilling all obligations hereunder. In no event shall the total compensation and costs payable to CONTRACTOR under this Agreement exceed the sum of [INSERT] Dollars (\$.....) unless specifically approved in advance and in writing by AGENCY

Such compensation shall cover all expenses, losses, damages, and consequences arising out of the nature of the work during its progress or prior to its acceptance including those for well and faithfully completing the work and the whole thereof in the manner and time specified in the aforesaid Contract Documents; and also including those arising from actions of the elements, unforeseen difficulties or obstructions encountered in the prosecution of the work, suspension or discontinuance of the work, and all other unknowns or risks of any description connected with the work.

B. This AGREEMENT is subject to the provisions of Article 1.7 (commencing at Section 20104.50) of Division 2, Part 3 of the Public Contract Code regarding prompt payment of contractors by local governments. Article 1.7 mandates certain procedures for the payment of undisputed and properly submitted payment requests within 30 days after receipt, for the review of payment requests, for notice to Contractor of improper payment requests, and provides for the payment of interest on progress payment requests which are not timely made in accordance with that Article. This AGREEMENT hereby incorporates the provisions of Article 1.7 as though fully set forth herein.

C. At the request and expense of CONTRACTOR, securities equivalent to the amount withheld shall be deposited with AGENCY, or with a state or federally chartered bank in this state as the escrow agent, who shall then pay those moneys to CONTRACTOR upon Agency's confirmation of CONTRACTOR'S satisfactory completion of this AGREEMENT. At any time during the term of this AGREEMENT CONTRACTOR may, at its own expense, substitute securities for funds otherwise withheld as retention (or the retained percentage) in accordance with Public Contract Code § 22300.

ARTICLE IV: Labor Code

AGENCY and CONTRACTOR acknowledge that this AGREEMENT is subject to the provisions of Division 2, Part 7, Chapter 1 (commencing with Section 1720) of the California Labor Code relating to public works and public agencies and agree to be bound by all the provisions thereof as though set forth fully herein. Full compensation for conforming to the requirements of the Labor Code and with other Federal, State and local laws related to labor, and rules, regulations and ordinances which apply to any work performed pursuant to this AGREEMENT is included in the price for all contract items of work involved.

This AGREEMENT is further subject to prevailing wage law, including, but not limited to, the following:

A. The CONTRACTOR shall pay the prevailing wage rates for all work performed under the AGREEMENT. When any craft or classification is omitted from the general prevailing wage determinations, the CONTRACTOR shall pay the wage rate of the craft or classification most closely related to the omitted classification. The CONTRACTOR shall forfeit as a penalty to AGENCY \$200.00 or any greater penalty provided in the Labor Code for each Calendar Day, or portion thereof, for each worker paid less than the prevailing wage rates for any work done under the AGREEMENT in violation of the provisions of the Labor Code whether such worker is employed in the execution of the work by CONTRACTOR or by any Subcontractor under CONTRACTOR. In addition, CONTRACTOR shall pay each worker the difference between such prevailing wage rates and the amount paid to each worker for each Calendar Day, or portion thereof, for which each worker was paid less than the prevailing wage rate.

B. CONTRACTOR shall comply with the provisions of Labor Code Section 1777.5 concerning the employment of apprentices on public works projects, and further agrees that CONTRACTOR is responsible for compliance with Section 1777.5 by all of its subcontractors.

C. Pursuant to Labor Code § 1725.5, CONTRACTOR and any subcontractor must be registered with the California Department of Industrial Relations for any bid proposal submitted on or after March 1, 2015, and for any contract for public work entered into on or after April 1, 2015. Further, this project is subject to compliance monitoring and enforcement by the Department of Industrial Relations.

D. Pursuant to Labor Code § 1776, CONTRACTOR and any subcontractor shall keep accurate payroll records, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by him or her in connection with this AGREEMENT. Each payroll record shall contain or be verified by a written declaration that it is made under penalty of perjury, stating both of the following: (1) The information contained in the payroll record is true and correct; and (2) The employer has complied with the requirements of Labor Code §§ 1811, and 1815 for any work performed by his or her employees on the public works project. The payroll records enumerated under subdivision (a) shall be certified and shall be available for inspection at all reasonable hours as required by Labor Code § 1776.

E. This AGREEMENT is further subject to 8-hour work day and wage and hour penalty law, including, but not limited to, Labor Code Sections 1810 and 1813, as well as California nondiscrimination laws, as follows:

CONTRACTOR shall strictly adhere to the provisions of the Labor Code regarding the 8-hour day and the 40-hour week, overtime, Saturday, Sunday and holiday work and nondiscrimination on the basis of race, religious creed, color, national origin, ancestry, physical disability, mental disability, medical condition, marital status, sex or sexual orientation, except as provided in Section 12940 of the Government Code. Pursuant to the provisions of the Labor Code, eight hours' labor shall constitute a legal day's work. Work performed by CONTRACTOR's employees in excess of eight hours per day, and 40 hours during any one week, must include compensation for all hours worked in excess of eight hours per day, or 40 hours during any one week, at not less than one and one-half times the basic rate of pay. CONTRACTOR shall forfeit as a penalty to AGENCY \$25.00 or any greater penalty set forth in the Labor Code for each worker employed in the execution of the work by CONTRACTOR or by any Subcontractor of CONTRACTOR, for each Calendar Day during which such worker is required or permitted to the work more than eight hours in one Calendar Day or more than 40 hours in any one calendar week in violation of the Labor Code.

F. This AGREEMENT is subject to Public Contract Code Section 6109: CONTRACTOR shall be prohibited from performing work on this project with a subcontractor who is ineligible to perform work on the project pursuant to Sections 1777.1 or 1777.7 of the Labor Code.

ARTICLE V: Work Site Conditions

A. In compliance with and pursuant to Government Code Section 4215, AGENCY shall assume the responsibility, as between the parties to this AGREEMENT, for the timely removal, relocation, or protection of existing main- or trunk-line utility facilities located on the site of any construction project that is a subject of this AGREEMENT, if such utilities are not identified by AGENCY in the plans and specifications made a part of the invitation for bids. The Contract Documents shall include provisions to compensate CONTRACTOR for the costs of locating, repairing damage not due to the failure of CONTRACTOR to exercise reasonable care, and removing or relocating such utility facilities not indicated in the plans and specifications with reasonable accuracy, and for equipment on the project necessarily idled

during such work. CONTRACTOR shall not be assessed liquidated damages for delay in completion of the project, when such delay was caused by the failure of AGENCY or the owner of a utility to provide for removal or relocation of such utility facilities.

B. To the extent that the work requires trenches in excess of five feet (5') and is estimated to cost more than \$25,000, prior to any excavation, CONTRACTOR must provide the AGENCY, or a registered civil or structural engineer employed by the AGENCY to whom authority has been delegated to accept such plans, a detailed plan showing the design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground during the excavation of such trench or trenches. If such plan varies from the shoring system standards, the plan shall be prepared by a registered civil or structural engineer. Nothing in this section shall be deemed to allow the use of a shoring, sloping, or protective system less effective than that required by the Construction Safety Orders.

C. This AGREEMENT is further subject to Public Contract Code Section 7104 with regard to any trenches deeper than four feet (4') involved in the proposed work as follows:

CONTRACTOR shall promptly, and before the following conditions are disturbed, notify AGENCY, in writing, of any:

- (1) Material that CONTRACTOR believes may be hazardous waste, as defined in Section 25117 of the Health and Safety Code, which is required to be removed to a Class I, Class II, or Class III disposal site in accordance with existing law.
- (2) Subsurface or latent physical conditions at the site differing from those indicated by all available information provided prior to the deadline for submission of bids.
- (3) Unknown physical conditions at the site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the contract.

AGENCY shall promptly investigate the conditions, and if it finds that the conditions do materially so differ, or involve hazardous waste, and cause a decrease or increase in CONTRACTOR's cost of, or the time required for, performance of any part of the work, AGENCY shall issue a change order under the procedures described in this AGREEMENT.

In the event that a dispute arises between AGENCY and CONTRACTOR whether the conditions materially differ, or involve hazardous waste, or cause a decrease or increase in CONTRACTOR's cost of, or time required for, performance of any part of the work, CONTRACTOR shall not be excused from any scheduled completion date provided in the AGREEMENT, but shall proceed with all work to be performed under the AGREEMENT. CONTRACTOR shall retain any and all rights provided either by contract or by law which pertain to the resolution of disputes and protests between the contracting parties.

ARTICLE VI: Insurance

A. With respect to performance of work under this AGREEMENT, CONTRACTOR shall maintain, and shall require all of its subcontractors to maintain, insurance as required by Section E "Standard Specifications" of the Contract Documents.

B. This AGREEMENT is further subject to Workers' Compensation obligations, including, but not limited to, California Labor Code Sections 1860 and 1861 as follows:

CONTRACTOR shall take out and maintain, during the life of this contract, Worker's Compensation Insurance for all of CONTRACTOR's employees employed at the site of improvement; and, if any work is sublet, CONTRACTOR shall require the subcontractor similarly to provide Worker's Compensation Insurance for all of the latter's employees, unless such employees are covered by the protection afforded by CONTRACTOR. CONTRACTOR and any of CONTRACTOR's subcontractors shall be required to provide AGENCY with a written statement acknowledging its obligation to secure payment of Worker's Compensation Insurance as required by Labor Code § 1861; to wit: 'I am aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this contract.' If any class of employees engaged in work under this AGREEMENT at the site of the Project is not protected under any Worker's Compensation law, CONTRACTOR shall provide and shall cause each subcontractor to provide adequate insurance for the protection of employees not otherwise protected. CONTRACTOR shall indemnify and hold harmless AGENCY for any damage resulting from failure of either CONTRACTOR or any subcontractor to take out or maintain such insurance.

ARTICLE VII: Indemnification

To the fullest extent permitted by law, CONTRACTOR shall, at its sole cost and expense, fully defend, indemnify and hold harmless AGENCY, its authorized representatives and their respective subsidiaries, affiliates, members, directors, officers, employees and agents (collectively, the "Indemnitees") from and against any and all claims, actions, demands, costs, judgments, liens, penalties, liabilities, damages, losses, and expenses, including but not limited to any fees of accountants, attorneys or other professionals (collectively "Liabilities"), arising out of, in connection with, resulting from or related to, any alleged act, omission, fault or negligence of CONTRACTOR, CONTRACTOR's Representative, or any of its officers, agents, employees, Subcontractors or Suppliers, or any person or organization directly or indirectly employed by any of them (Collectively, the "Indemnitors"), in connection with or relating to or claimed to be in connection with or relating to the work performed under this AGREEMENT. CONTRACTOR shall not be entitled to any refund of attorneys' fees, defense costs and expenses in the event that it is adjudicated to have been non-negligent.

CONTRACTOR shall not be required to defend or indemnify AGENCY for liabilities caused by the sole active negligence or willful misconduct of the AGENCY.

If CONTRACTOR is a joint venture or partnership, each venturer or partner shall be jointly and severally liable for any and all of the duties and obligations of CONTRACTOR that are assumed under or arise out of this AGREEMENT. Each of such venturers or partners waives notice of the breach or non-performance of any undertaking or obligation of CONTRACTOR contained in, resulting from or assumed under this AGREEMENT, and the failure to give any such notice shall not affect or impair such venture's or partner's joint and several liability hereunder.

ARTICLE VIII: Binding Effect

AGENCY and CONTRACTOR each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto and to its partners, successors, assigns, and legal representatives in respect of all covenants, agreements, and obligations contained in the Contract Documents. This AGREEMENT is not assignable nor the performance of either party's duties delegable without the prior written consent of the other party. Any attempted or purported assignment or delegation of any of the rights or obligations of either party without the prior written consent of the other shall be void and of no force and effect.

ARTICLE IX: Dispute Resolution

A. Any court action arising out of this AGREEMENT shall be filed in the Placer County Superior Court. Any alternative dispute resolution proceeding arising out of this AGREEMENT shall be heard in the County of Placer.

B. AGENCY shall have full authority to compromise or otherwise settle any claim relating to this AGREEMENT or any part hereof at any time. AGENCY shall provide timely notification to CONTRACTOR of the receipt of any third-party claim relating to this AGREEMENT. AGENCY shall be entitled to recover its reasonable costs incurred in providing the notification required by this section.

C. This AGREEMENT is further subject to the provisions of Article 1.5 (commencing at Section 20104) of Division 2, Part 3 of the Public Contract Code regarding the resolution of public works claims of less than \$375,000. Article 1.5 mandates certain procedures for the filing of claims and supporting documentation by Contractor, for the response to such claims by the Agency, for a mandatory meet and confer conference upon the request of Contractor, for mandatory nonbinding mediation in the event litigation is commenced, and for mandatory judicial arbitration upon the parties' failure to resolve the dispute through mediation. This AGREEMENT hereby incorporates the provisions of Article 1.5 as though fully set forth herein.

ARTICLE X: Independent Contractor

CONTRACTOR is and shall at all times remain as to AGENCY, a wholly independent contractor. Neither AGENCY nor any of its agents shall have control of the conduct of CONTRACTOR or any of CONTRACTOR's employees, except as herein set forth. CONTRACTOR shall not at any time or in any manner represent that it or any of its agents or employees are in any manner agents or employees of AGENCY.

ARTICLE XI: Taxes

CONTRACTOR is responsible for paying all retail, sales and use, transportation, export, import, special or other taxes and duties applicable to, and assessable against any work, materials, equipment, services, processes and operations incidental to or involved in this AGREEMENT. The CONTRACTOR is responsible for ascertaining and arranging to pay such taxes and duties. The prices established in this AGREEMENT shall include compensation for any taxes the CONTRACTOR is required to pay by laws and regulations in effect as of the execution of this AGREEMENT.

ARTICLE XII: Notices

All notices and communications shall be sent in writing to the parties at the following addresses:

AGENCY: MENGIL DEANE

CONTRACTOR: [INSERT CONTACT]

CITY OF AUBURN

CONTRACTOR'S BUSINESS NAME

1225 Lincoln Way

Mailing Address

Auburn, CA 95603

City, State Zip Code

ARTICLE XIII: Entire Agreement

This AGREEMENT supersedes any and all other agreements, either oral or written, between the parties and contains all of the covenants and agreements between the parties pertaining to the work of improvements described herein. Each party to this AGREEMENT acknowledges that no representations, inducements, promises or agreements, orally or otherwise, have been made by any party, or anyone acting on behalf of any party, which are not embodied herein, and that any other agreement, statement or promise not contained in this AGREEMENT shall not be valid or binding. Any modification of this AGREEMENT will be effective only if signed by the party to be charged.

The benefits and obligations of this AGREEMENT shall inure to and be binding upon the representatives, agents, partners, heirs, successors and assigns of the parties hereto. This AGREEMENT shall be construed pursuant to the laws of the State of California.

ARTICLE XIV: Authority to Contract

The signatories hereto represent that they are authorized to sign on behalf of the respective parties they represent and are competent to do so, and each of the parties hereto hereby irrevocably waives any and all rights to challenge signatures on these bases.

ARTICLE XV: General Provisions

A. All reports, documents or other written material ("written products" herein) developed by CONTRACTOR in the performance of this Agreement shall be and remain the property of AGENCY without restriction or limitation upon its use or dissemination by AGENCY. CONTRACTOR may take and retain copies of such written products as desired, but no such written products shall be the subject of a copyright application by CONTRACTOR.

B. In the performance of this Agreement, CONTRACTOR shall not discriminate against any employee, subcontractor, or applicant for employment because of race, color, creed, religion, sex, marital status, sexual orientation, national origin, ancestry, age, physical or mental disability, medical condition or any other unlawful basis.

C. The captions appearing at the commencement of the sections hereof, and in any paragraph thereof, are descriptive only and for convenience in reference to this Agreement. Should there be any conflict between such heading, and the section or paragraph at the head of which it appears, the section or paragraph hereof, as the case may be, and not such heading, shall control and govern in the construction of this Agreement. Masculine or feminine pronouns shall be substituted for the neuter form and vice versa, and the plural shall be substituted for the singular form and vice versa, in any place or places herein in which the context requires such substitution(s).

D. The waiver by AGENCY or CONTRACTOR of any breach of any term, covenant or condition herein contained shall not be deemed to be a waiver of such term, covenant or condition or of any subsequent breach of the same or any other term, covenant or condition herein contained. No term, covenant or condition of this Agreement shall be deemed to have been waived by AGENCY or CONTRACTOR unless in writing.

E. Each right, power and remedy provided for herein or now or hereafter existing at law, in equity, by statute, or otherwise shall be cumulative and shall be in addition to every other right, power, or remedy provided for herein or now or hereafter existing at law, in equity, by statute, or otherwise. The exercise, the

commencement of the exercise, or the forbearance of the exercise by any party of any one or more of such rights, powers or remedies shall not preclude the simultaneous or later exercise by such party of any of all of such other rights, powers or remedies.

F. CONTRACTOR shall maintain any and all ledgers, books of account, invoices, vouchers, canceled checks, and other records or documents evidencing or relating to charges for services or expenditures and disbursements charged to CITY under this Agreement for a minimum of three (3) years, or for any longer period required by law, from the date of final payment to CONTRACTOR under this Agreement. All such documents shall be made available for inspection, audit, and/or copying at any time during regular business hours, upon oral or written request of CITY. In addition, pursuant to Government Code Section 8546.7, all such documents and this Agreement shall be subject to the examination and audit of the State Auditor, at the request of CITY or as part of any audit of CITY, for a period of three (3) years after final payment under the Agreement.

IN WITNESS WHEREOF the parties hereto for themselves, their heirs, executors, administrators, successors, and assigns do hereby agree to the full performance of the covenants herein contained and have caused this AGREEMENT to be executed in duplicate by setting hereunto their names, titles, hands, and seals this ____th day of _____, 2022 *(Council Action Date Here)*

CONTRACTOR: *[Contractor's Business Name]*

Contractor's Sign Name, Title

Contractor's License No. _____

Subscribed and sworn to this _____ day of _____, 20__.

NOTARY PUBLIC _____ (SEAL)

AGENCY: _____
Mayor of the _____ Date
City of Auburn

ATTESTED: _____
City Clerk of the _____ Date
City of Auburn

APPROVED AS
TO FORM: _____
City Attorney of the _____ Date
City of Auburn

(EXECUTE IN DUPLICATE)

PAYMENT BOND

WHEREAS, the City of Auburn, as AGENCY has awarded to _____, as CONTRACTOR, a contract for the above-stated project;

AND WHEREAS, CONTRACTOR is required to furnish a bond in connection with the contract, to secure the payment of claims of laborers, mechanics, material persons, and other persons as provided by law;

NOW THEREFORE, we, the undersigned CONTRACTOR and SURETY, are held and firmly bound unto AGENCY in the sum of _____ Dollars

(\$ _____) which is one hundred percent (100%) of the total contract amount for the above-stated project, for which payment well and truly to be made we bind ourselves, our heirs, executors and administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITIONS OF THIS OBLIGATION IS SUCH that if CONTRACTOR, its heirs, executors, administrators, successors, assigns or subcontractors, shall fail to pay any of the persons named in Civil Code Section 9100, or amounts due under the Unemployment Insurance Code with respect to work or labor withheld, and to pay over to the Employment Development Department from the wages of employees of the CONTRACTOR and its subcontractors pursuant to Section 13020 of the Unemployment Insurance Code, with respect to such work and labor, that the surety or sureties herein will pay for the same in an amount not exceeding the sum specified in this bond, otherwise the above obligation shall be void. In case suit is brought upon this bond, SURETY will pay reasonable attorneys' fees to the plaintiffs and AGENCY in an amount to be fixed by the court.

This bond shall inure to the benefit to any of the persons named in Civil Code Section 9100 as to give a right of action to such persons or their assigns in any suit brought upon this bond.

The SURETY hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or the specifications accompanying it shall in any manner affect SURETY's obligations on this bond. The SURETY hereby waives notice of any such change, extension, alteration or addition and hereby waives the requirements of Section 2845 of the Civil Code as a condition precedent to any remedies AGENCY may have.

IN WITNESS WHEREOF the parties hereto have set their names, titles, hands, and seals this day of _____, 2022.

Contractor*

Contractor's Signer's Name, Title

Contractor's Business Name

Mailing Street Address

City, State, Zip Code

Telephone #

Surety*

*Provide CONTRACTOR and SURETY name, address and telephone number and the name, title, address and telephone number for the respective authorized representatives. Power of Attorney must be attached.

Subscribed and sworn to this ____ day of _____, 2022.

NOTARY PUBLIC.....

(SEAL)

(EXECUTE IN DUPLICATE)

FAITHFUL PERFORMANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS That _____, hereinafter referred to as "CONTRACTOR" as PRINCIPAL, and _____, a corporation duly organized and doing business under and by virtue of the laws of the State of California and duly licensed for the purpose of making, guaranteeing, or becoming sole surety upon bonds or undertakings as Surety, are held and firmly bound unto the CITY OF AUBURN, CALIFORNIA, hereinafter referred to as the "AGENCY" in the sum of _____ Dollars

(\$ _____); which is one hundred percent (100%) of the total contract amount for the above stated project; lawful money of the United States of America for the payment of which sum, well and truly to be made, we bind ourselves, our heirs, executors, administrators, assigns and successors, jointly and severally, firmly by these presents.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH, that whereas CONTRACTOR has been awarded and is about to enter into a Contract with AGENCY to perform all work required pursuant to the contract documents for the project entitled: **2022 SEWER IMPROVEMENTS PROJECT** CONTRACT which Contract is by this reference incorporated herein, and is required by AGENCY to give this Bond in connection with the execution of the Contract;

NOW, THEREFORE, if CONTRACTOR and his or her Subcontractors shall well and truly do and perform all the covenants and obligations of the Contract on his or her part to be done and performed at the times and in the manner specified herein including compliance with all Contract specifications and quality requirements, then this obligation shall be null and void, otherwise it shall be and remain in full force and effect;

PROVIDED, that any alterations in the work to be done, or in the material to be furnished, which may be made pursuant to the terms of the Contract, shall not in any way release CONTRACTOR or the Surety thereunder, nor shall any extensions of time granted under the provisions of the Contract release either CONTRACTOR or said Surety, and notice of such alterations of extensions of the Contract is hereby waived by said Surety.

In the event suit is brought upon this Bond by AGENCY and judgment is recovered, said Surety shall pay all costs incurred by AGENCY in such suit, including a reasonable attorney's fee to be fixed by the Court.

IN WITNESS WHEREOF the parties hereto have set their names, titles, hands, and seals this.....day of _____, 2022

Contractor* Name, Title of Signer SURETY*.....
Contractor's Business Name

.....
Mailing Street Address
City, State, Zip Code

..... Telephone #
.....

*Provide CONTRACTOR and SURETY name, address and telephone number and the name, title, address and telephone number for their respective authorized representatives. Power of Attorney must be attached.

Subscribed and sworn to this ___ day of _____, 2022

NOTARY PUBLIC..... (SEAL)

(EXECUTE IN DUPLICATE)

MAINTENANCE BOND

KNOW ALL PERSONS BY THESE PRESENTS THAT WHEREAS, the City of Auburn, as AGENCY has awarded to _____, as CONTRACTOR, a contract for the above-stated project. AND WHEREAS, CONTRACTOR is required to furnish a bond in connection with the contract guaranteeing maintenance thereof;

NOW, THEREFORE, we, the undersigned CONTRACTOR and SURETY, are held firmly bound unto AGENCY in the sum of _____ Dollars (\$ _____), which is fifty percent (50%) of the total contract amount for the above-stated project to be paid to AGENCY, its successors and assigns, for which payment well and truly to be made, we bind ourselves, our heirs, executors and administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITIONS OF THIS OBLIGATION ARE SUCH that if CONTRACTOR shall remedy without cost to AGENCY any defects which may develop during a period of one (1) year from the date of recordation of the Notice of Completion of the work performed under the contract, provided such defects are caused by defective or inferior materials or work, then this obligation shall be void; otherwise it shall be and remain in full force and effect. In case suit is brought upon this bond, SURETY will pay reasonable attorneys' fees to the AGENCY in an amount to be fixed by the court.

IN WITNESS WHEREOF the parties hereto have set their names, titles, hands, and seals this ____ day of _____, 2022.

Contractor*

Contractor's Signer's Name, Title
Contractor's Business Name
Mailing Street Address
City, State, Zip Code
Telephone #

SURETY*

*Provide CONTRACTOR and SURETY name, address and telephone number and the name, title, address and telephone number for their respective authorized representatives. Powers of Attorney must be attached.

Subscribed and sworn to this day of....., 2022.

NOTARY PUBLIC.....

(SEAL)

(EXECUTE IN DUPLICATE)

WORKERS' COMPENSATION INSURANCE CERTIFICATE

The Contractor shall execute the following form as required by the California Labor Code, Sections 1860 and 1861:

I am aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this contract.

DATE: _____ Contractor's Business Name.
(Contractor)
By: _____
(Signature)
(Title)

Attest:

By: _____
(Signature)
(Title)

Note: See Section 7 Responsibility of the Contractor, Paragraph 7-3 of the Standard Specifications for insurance carrier rating requirements.

ENDORSEMENTS TO INSURANCE POLICY

Name of Insurance Company:

Policy Number:

Effective Date:

The following endorsements are hereby incorporated by reference into the attached Certificate of Insurance as though fully set forth thereon:

1. The naming of an additional insured as herein provided shall not affect any recovery to which such additional insured would be entitled under this policy if not named as such additional insured, and
2. The additional insured named herein shall not be held liable for any premium or expense of any nature on this policy or any extensions thereof, and
3. The additional insured named herein shall not by reason of being so named be considered a member of any mutual insurance company for any purpose whatsoever, and
4. The provisions of the policy will not be changed, suspended, canceled or otherwise terminated as to the interest of the additional insured named herein without first giving such additional insured twenty (20) days' written notice.
5. Any other insurance held by the additional insured shall not be required to contribute anything toward any loss or expense covered by the insurance, which is referred to by this certificate.
6. **The company provided insurance for this certificate is a company licensed to do business in the State of California with a Best's rating of A+ VIII or greater.**

It is agreed that the City of Auburn, its officers and employees, are included as Additional Insureds under the contracts of insurance for which the Certificate of Insurance is given.

Authorized Insurance Agent

Date: _____

STATEMENT REGARDING INSURANCE COVERAGE

The undersigned representative of Bidder hereby certifies that he/she has reviewed the insurance coverage requirements specified in **7-3 LIABILITY INSURANCE** of Section E, Standard Specifications. Should Bidder be awarded the contract for the work, the undersigned further certifies that Bidder can meet all of these specification requirements for insurance including insurance coverage of his/her subcontractors.

NAME OF BIDDER:

MAILING ADDRESS:
.....
.....

AUTHORIZED SIGNATURE:

TITLE:

DATE:

STATEMENT REGARDING CONTRACTOR'S LICENSING LAWS

[Business & Professions Code § 7028.15]
[Public Contract Code § 20103.5]

I, the undersigned, certify that I am aware of the following provisions of California law and that I, or the entity on whose behalf this certification is given, hold a currently valid California contractor's license as set forth below:

Business & Professions Code § 7028.15:

- a) **It is a misdemeanor for any person to submit a bid to a public agency to engage in the business or act in the capacity of a contractor within this state without having a license therefor**, except in any of the following cases:

(1) The person is particularly exempted from this chapter.

(2) The bid is submitted on a state project governed by Section 10164 of the Public Contract Code

or on any local agency project governed by Section 20104 [now § 20103.5] of the Public Contract Code.

- b) If a person has been previously convicted of the offense described in this section, the court shall impose a fine of 20 percent of the price of the contract under which the unlicensed person performed contracting work, or four thousand five hundred dollars (\$4,500), whichever is greater, or imprisonment in the county jail for not less than 10 days nor more than six months, or both.

In the event the person performing the contracting work has agreed to furnish materials and labor on an hourly basis, "the price of the contract" for the purposes of this subdivision means the aggregate sum of the cost of materials and labor furnished and the cost of completing the work to be performed.

- c) This section shall not apply to a joint venture license, as required by Section 7029.1. However, at the time of making a bid as a joint venture, each person submitting the bid shall be subject to this section with respect to his/her individual licenser.
- d) This section shall not affect the right or ability of a licensed architect, land surveyor, or registered professional engineer to form joint ventures with licensed contractors to render services within the scope of their respective practices.
- e) Unless one of the foregoing exceptions applies, a bid submitted to a public agency by a contractor who is not licensed in accordance with this chapter shall be considered nonresponsive and shall be rejected by the public agency. Unless one of the foregoing exceptions applies, a local public agency shall, before awarding a contract or issuing a purchase order, verify that the contractor was properly licensed when the contractor submitted the bid. Notwithstanding any other provision of law, unless one of the foregoing exceptions applies, the registrar may issue a citation to any public officer or employee of a public entity who knowingly awards a contract or issues a purchase order to a contractor who is not licensed pursuant to this chapter. The amount of civil penalties, appeal, and finality of such citations shall be subject to Sections 7028.7 to 7028.13, inclusive. **Any contract awarded to, or any purchase order issued to, as contractor who is not licensed pursuant to this chapter is void.**

- f) Any compliance or noncompliance with subdivision (e) of this section, as added by Chapter 863 of the Statutes of 1989, shall not invalidate any contract or bid awarded by a public agency during which time that subdivision was in effect.
- g) A public employee or officer shall not be subject to a citation pursuant to this section if the public employee, officer, or employing agency made an inquiry to the board for the purposes of verifying the license status of any person or contractor and the board failed to respond to the inquiry within three business days. For purposes of this section, a telephone response by the board shall be deemed sufficient.

Public Contract Code § 20103.5:

In all contracts subject to this part where federal funds are involved, no bid submitted shall be invalidated by the failure of the bidder to be licensed in accordance with the laws of this state. However, at the time the contract is awarded, the contractor shall be properly licensed in accordance with the laws of this state. The first payment for work or material under any contract shall not be made unless and until the Registrar of Contractors verifies to the agency that the records of the Contractors' State License Board indicate that the contractor was properly licensed at the time the contract was awarded. Any bidder or contractor not so licensed shall be subject to all legal penalties imposed by law, including, but not limited to, any appropriate disciplinary action by the Contractors' State License Board. The agency shall include a statement to that effect in the standard form of pre-qualification questionnaire and financial statement. **Failure of the bidder to obtain proper and adequate licensing for an award of a contract shall constitute a failure to execute the contract and shall result in the forfeiture of the security of the bidder.**

Contractors License Number: _____

License Expiration Date: _____

Authorized Signature: _____

Date: _____

SECTION E

2022 SEWER IMPROVEMENTS PROJECT IN THE CITY OF AUBURN, CALIFORNIA

STANDARD SPECIFICATIONS

STANDARD SPECIFICATIONS

0-1 STANDARD SPECIFICATIONS

Except as noted in section 0-3 below, the provisions of the 2018 Edition of the Caltrans Standard Specifications, with the latest supplements, updates, and amendments, prepared and promulgated by the California Department of Transportation, are adopted as the “Standard Specifications” for the Agency.

0-2 NUMBERING OF SECTIONS

The Special Provisions stated below will be numbered as Sections 700 through 799. Subsections of architectural work may be numbered according to the Construction Specifications Institute (“CSI”) format.

0-3 AMENDMENTS AND MODIFICATIONS

Division I “General Provisions” of the Caltrans Standard Specifications is deleted in its entirety and replaced with the following provisions. The remaining provisions of the 2010 Caltrans Standard Specifications, and any updates, supplements or amendments to those remaining provisions will remain in effect unless they conflict with other provisions set forth in this Agreement. In the event of any inconsistencies between the following Standard Specifications and those set forth in the Caltrans Standard Specifications, the following provisions shall control.

1-1 TERMS. Unless otherwise stated, the words *directed*, *required*, *permitted*, *ordered*, *instructed*, *designated*, *considered necessary*, *prescribed*, *approved*, *acceptable*, *satisfactory*, or words of like meaning, refer to actions, expressions, and prerogatives of the Engineer.

1-2 DEFINITIONS

Acceptance – The AGENCY’s formal written acceptance of a project that has been completed in all respects in accordance with the plans and specifications and any modifications thereof.

Addendum – Written or graphic instrument issued prior to the opening of Bids which clarifies, corrects, or changes the bidding or Contract Documents. The term Addendum shall include bulletins and all other types of written notices issued to potential bidders prior to opening of Bids.

AGENCY – The City of Auburn.

Agent – Shall include persons and companies, other than the CONTRACTOR, retained by the City to perform design and construction services in relation to the Work.

Agreement – See Contract.

Base – A layer of specified material of planned thickness placed immediately below the pavement or surfacing.

Bid – The offer or proposal of the Bidder submitted on the prescribed form setting forth the prices for the Work.

Bidder – Any individual, firm, partnership, corporation, or combination thereof, submitting a Bid for the Work, acting directly or through a duly authorized representative.

Board – The officer or body constituting the awarding authority of the AGENCY. The City Council.

Bond – Bid, performance, and payment bond or other instrument of security.

Cash Contract – A Contract financed by means other than special assessments.

Change Order – A written order to the CONTRACTOR signed by the AGENCY directing an addition, deletion, or revision in the Work, or an adjustment in the Contract Price or the Contract time issued after the effective date of the Contract. A Change Order may or may not also be signed by the CONTRACTOR.

City – The City of Auburn, California, as the AGENCY and Owner.

City Council – City Council of the City of Auburn, California.

Code – The terms *Government Code*, *Labor Code*, etc., refer to codes of the State of California.

Construction Manager – Persons and/or company retained by the City to perform construction management services.

Contract – The written agreement between the AGENCY and the CONTRACTOR covering the Work.

Contract Documents – Including, but not limited to: the Contract, any Addendum (which pertain to the contract documents), Notice Inviting Bids, Instructions to Bidders; Bid (including documentation accompanying the Bid and any post-bid documentation submitted prior to the Notice of Award) when attached as an exhibit to the Contract, the Bonds, the general conditions, permits from other agencies, the Special Provisions, the Plans, Standard Plans, Standard Specifications, Reference Specifications, and all Modifications issued after the execution of the Contract.

CONTRACTOR – The individual, partnership, corporation, joint venture, or other legal entity having a Contract with the AGENCY to perform the Work. In the case of work being done under permit issues by the AGENCY, the permittee shall be construed to be the CONTRACTOR. The term “prime CONTRACTOR” shall mean CONTRACTOR.

Contract Price – The total amount of money for which the Contract is awarded.

Contract Unit Price – The amount stated in the Bid for a single unit of an item of work.

County Sealer – The Sealer of Weights and Measures of the county in which the Contract is let.

Days – Days shall mean consecutive calendar’s days unless otherwise specified.

Design Engineer – Persons and/or company retained by the City to perform engineering design services.

Due Notice – A written notification, provided in due time, of a proposed action, where the contract requires such notification within a specified time (usually 48 hours or two working days) prior to the commencement of the contemplated action.

Electrolier – Street light assembly complete, including foundation, standard, luminaire arm, luminaire, etc.

Engineer – The City Engineer of the City of Auburn, or his/her authorized representative.

Geotechnical Engineer – Person licensed to practice Soils Engineering or Geotechnical Engineering pursuant to the laws of the State of California and retained by the AGENCY during construction.

Geotextile – Synthetic fiber used in civil engineering applications, serving the primary functions of separation and filtration.

House Connection Sewer – A sewer, within a public street or right-of-way, proposed to connect any parcel, lot or part of a lot with a mainline sewer.

House Sewer – A sewer, wholly within private property, proposed to connect any building to a house connection sewer.

Luminaire – The lamp housing including the optical and socket assemblies (and ballast if so specified).

Luminaire Arm – The structural member, bracket, or mast arm, which, mounted on the standard, supports the luminaire.

Modification – Includes Change Orders and Supplemental Agreements. A Modification may only be issued after the effective date of the Contract.

Notice of Award – The written notice by the AGENCY to the successful Bidder stating that upon compliance by it with the required conditions, the AGENCY will execute the Contract.

Notice to Proceed – A written notice given by the AGENCY to the CONTRACTOR fixing the date on which the Contract time will start.

Person – Any individual, firm, association, partnership, corporation, trust, joint venture, or other legal entity.

Plans – The drawings, profiles, cross sections, working drawings, and supplemental drawings, or reproductions thereof, approved by the Engineer, which show the location, character, dimensions, or details of the Work.

Private Contract – Work subject to AGENCY inspection, control, and approval, involving private funds, not administered by the AGENCY.

Prompt – The briefest interval of time required for a considered reply, including time required for approval by a governing body.

Proposal – See Bid.

Reference Specifications – Those bulletins, standards, rules, methods of analysis or test, codes, and specifications of other agencies, engineering societies, or industrial associations referred to in the Contract Documents. These refer to the latest edition, including amendments in effect and published at the time of advertising the project or issuing the permit, unless specifically referred to by edition, volume, or date.

Roadway – The portion of a street reserved for vehicular use.

Service Connection – Service connections are all or any portion of the conduit, cable, or duct, including meter, between a utility distribution line and an individual consumer.

Sewer – Any conduit intended for the reception and transfer of sewage and fluid industrial waste.

Special Provisions – Additions and revisions to the Standard Specifications setting for the conditions and requirements peculiar to the Work.

Specifications – Standard Specifications, Reference Specifications, Special Provisions, and specifications in Supplemental Agreements between the CONTRACTOR and the Board.

Standard – The shaft or pole used to support street lighting luminaire, traffic signal heads, mast arms, etc.

Standard Plans – “Standard Plans for Public Works Construction” or “SSPWC” – Latest edition of the Southern California Chapter of the American Public Works Association.

State Standard Specifications (“SSS”) – Standard Specifications prepared by the State of California, Business and Transportation Agency, Department of Transportation.

State Standard Plans (“SSP”) – Standard Plans prepared by State of California, Business and Transportation Agency, Department of Transportation.

State – State of California.

Storm Drain – Any conduit and appurtenances intended for the reception and transfer of storm water.

Street – Any road, highway, parkway, freeway, alley, walk, or way.

Subbase – A layer of specified materials of planned thickness between a base and the subgrade.

Subcontractor – An individual, firm, or corporation having a direct contract with the CONTRACTOR or with any other Subcontractor for the performance of a part of the Work.

Subgrade – For roadways, that portion of the roadbed on which pavement, surfacing, base, subbase, or a layer of other materials is placed. For structures, the soil prepared to support a structure.

Supervision – Supervision, where used to indicate supervision by the Engineer, shall mean the performance of obligations, and the exercise of rights, specifically imposed upon and granted to the AGENCY in becoming a party to the Contract. Except as specifically stated herein, supervision by the AGENCY shall not mean active and direct superintendence of details of the Work.

Supplemental Agreement – A written amendment of the Contract Documents signed by both parties.

Surety – Any individual, firm, or corporation, bound with and for the CONTRACTOR for the acceptable performance, execution, and completion of the Work, and for the satisfaction of all obligations incurred.

Tonne – Also referred to as “metric ton” — Represents a unit of measure in the International System of Units equal to 1,000 kilograms.

Utility – Tracks, overhead or underground wires, pipeline, conduits, ducts, or structures, sewers, or storm drains owned, operated, or maintained in or across a public right of way or private easement.

Work – That which is proposed to be constructed or done under the Contract or permit, including the furnishing of all labor, materials, equipment, and services.

Working Days – Any days, except: (1) Saturdays, Sundays, legal holidays on which Auburn City Hall is closed for business; (2) days when work is suspended by the Engineer for reasons unrelated to the performance of the CONTRACTOR, and provided in Subsections 6-3 and 6-3.1; and (3) days determined to be non-working in accordance with Section 6-7 “Time of Completion”

1-3 ABBREVIATIONS

1-3.1 Common Usage Terms. These Standard Specifications incorporate by reference the list of common usage terms in the edition of the “Standard Plans for Public Works Construction” with the following additions:

ARAM Asphalt Rubber Aggregate Membrane

ARHM Asphalt Rubber Hot Mix

1-3.3 Institutions. These Standard Specifications incorporate by reference the list of commonly used institution terms in the edition of the “Standard Plans for Public Works Construction” (aka the Greenbook) with the following additions:

ACI	American Concrete Institute
AGCA	Associated General CONTRACTORs of America
APWA	American Public Works Association
ASME	American Society of Mechanical Engineers
CRSI	Concrete Reinforcing Steel Institute
CSI	Construction Specifications Institute
IEEE	Institute of Electric and Electronic Engineers
NFPA	National Fire Protection Association
SSS	State of California Standard Specifications, latest edition, Department of Transportation
SSP	State of California Standard Plans, latest edition, Department of Transportation.
SSPWC	Standard Specifications for Public Works Construction
NEMA	National Electrical Manufacturers Association

1-4 UNITS OF MEASURE

1-4.1 General. U.S. Standard Measures, also called U.S. Customary System, are the principal measurement system in these specifications and shall be used for construction, unless otherwise stated in the Contract Documents. The International System of Units, also referred to as SI or the metric system, may be included in parenthesis. SI units and U.S. Standard Measures in parenthesis may or may not be exactly equivalent. Certain materials specifications and test requirements contained herein use SI units specifically and conversions to U.S. Standard Measures have not been included in these circumstances.

Reference is also made to ASTM E 380 for definitions of various units of the SI system and a more extensive set of conversion factors.

1-4.2 Units of Measure and Their Abbreviations.

U.S. Customary Unit (Abbreviations)	Equal To	SI Unit (Abbreviations)
1 mil (= 0.0001 in)		25.4 micrometer (μm)
1 inch (in)		25.4 millimeter (mm)
1 inch (in)		2.54 centimeter (cm)
1 foot (ft)		0.3048 meter (m)
1 yard (yd)		0.9144 meter (m)
1 mile (mi)		1.6093 kilometer (km)
1 square foot (ft^2)		0.0929 square meter (m^2)
1 square yard (yd^2)		0.8361 square meter (m^2)

U.S. Customary Unit (Abbreviations)	Equal To	SI Unit (Abbreviations)
1 cubic foot (ft ³)		0.0283 cubic meter (m ³)
1 cubic yard (yd ³)		0.7646 cubic meter (m ³)
1 acre		0.4047 hectare (ha)
1 U.S. gallon (gal)		3.7854 Liter (L)
1 fluid ounce (fl. oz.)		29.5735 milliliter (mL)
1 pound mass (lb) (avoirdupois)		0.4536 kilogram (kg)
1 ounce mass (oz)		0.02835 kilogram (kg)
1 Ton (= 2000 lb avoirdupois)09072 Tonne (= 907 kg)
1 Poise		0.1 pascal · second (Pa · s)
1 centistoke (cs)		1 square millimeters per second (mm ² /s)
1 pound force (lbf)		4.4482 Newton (N)
1 pounds per square inch (psi)		6.8948 Kilopascal (kPa)
1 pound force per foot (lbf/ft)		1.4594 Newton per meter (N/m)
1 foot-pound force (ft-lbf)		1.3558 Joules (J)
1 foot-pound force per second ([ft-lbf]/s)		1.3558 Watt (W)
1 part per million (ppm)		1 milligram /liter (mg/L)

Temperature Units and Abbreviations

Degree Fahrenheit (°F): Degree Celsius (°C):
 $^{\circ}\text{F} = (1.8 \times ^{\circ}\text{C}) + 32$ $^{\circ}\text{C} = (^{\circ}\text{F} - 32) / 1.8$

SI Units (abbreviation) Commonly Used in Both Systems

1 Ampere (A)
 1 Volt (V)
 1 Candela (cd)
 1 Lumen (lm)
 1 second (s)

Common Metric Prefixes

kilo (k)	10 ³
centi (c)	10 ⁻²
milli (m)	10 ⁻³
micro (μ)	10 ⁻⁶
nano (n)	10 ⁻⁹
pico (p)	10 ⁻¹²

1-5 SYMBOLS

Δ	Delta, the central angle or angle between tangents
\angle	Angle
%	Percent
'	Feet or minutes
"	Inches or seconds
¹	Number
/	per or (between words)
°	Degree
PL	Property line
CL	Centerline
SL	Survey line or station line

SECTION 2 – SCOPE AND CONTROL OF WORK

2-1 AWARD AND EXECUTION OF CONTRACT. Award and execution of Contract will be as provided for in the Specifications, Instructions to Bidders, or Notice Advertising for Bids. The City reserves the right to reject any or all proposals.

2-1.1 Investigation of Site Conditions. Prior to submittal of the bid, Bidders must visit the site of work and complete their own investigations to satisfy themselves as to the existing conditions affecting the work to be done under these specifications. If the bidder chooses not to visit the site or conduct investigations, he will, nevertheless, be charged with the knowledge of conditions which reasonable inspection and investigation would have disclosed.

After the project is awarded the CONTRACTOR shall carefully study and compare the Contract Documents with each other and with information available to the CONTRACTOR and furnished by the Owner and shall immediately notify the Engineer of errors, inconsistencies or omissions discovered. If the CONTRACTOR performs any construction activity knowing it involves a recognized error, inconsistency or omission in the Contract Documents without such notice to the Engineer, the CONTRACTOR shall assume appropriate responsibility for such performance and may assume responsibility for the full costs for correction.

The CONTRACTOR shall make field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the CONTRACTOR with the Contract Documents before commencing activities. Errors, inconsistencies or omissions discovered shall be reported to the Engineer immediately.

When existing conditions are encountered which, in the opinion of the Engineer, require temporary suspension of work for design modifications or for other determinations to be made, the CONTRACTOR shall move to other areas of work until such determinations are made at no cost to the City. No additional compensation will be allowed by reason of such temporary suspension of work, or modifications to work, except as noted in Section 3 of these Standard Specifications ("Changes in Work") for specific items of work not included in the bid. Appropriate extension of item for completion may be allowed where justification in the opinion of the Engineer.

2-1.2 Award of Contract. The Contract will be awarded, if at all, to the lowest responsible and responsive Bidder determined as provided on the Proposal Form, whose proposal complies with all the requirements prescribed. Such award, if made, will be made within the number of days stated in the proposal form. Refusal or failure to deliver the executed contract, bonds, or insurance in the form provided in the Contract and approved by the AGENCY's attorney within the time provided herein shall be cause, at the AGENCY's option, for the annulment of the award and forfeiture of the bid security. In such event, the AGENCY may successively award the Contract to the next lowest responsible and responsive Bidder until a properly executed Contract, bonds, and insurance is obtained, or it may at any time reject all remaining bids and proceed as provided by law. The refusal or failure of a successive lowest responsible and responsive Bidder to execute the Contract may, at the AGENCY's option, result in an annulment of the award to that Bidder and the forfeiture of that Bidder's bid security. The periods of time specified above within which the award of the Contract may be made shall be subject to extension for such further period as may be agreed upon in writing between the AGENCY and the concerned Bidder.

The AGENCY reserves the right to waive any irregularities.

Within ten (10) calendar days after the date of the Notice of Award, the CONTRACTOR shall execute and return the following contract documents to the AGENCY:

- Contract Agreement (in duplicate)
- Faithful Performance Bond (in duplicate)
- Maintenance Bond (in duplicate)
- Payment Bond (in duplicate)
- Public Liability and Property Damage Insurance Certificate (two original)
- Additionally Insured Endorsement
- Workers' Compensation Insurance Certificate (two original)

A corporation to which an award is made may be required, before the Contract agreement is executed by the AGENCY, to furnish evidence of its corporate existence, of its right to enter into contracts in the State of California, and that the officers signing the contract and bonds for the corporation have the authority to do so.

2-2 ASSIGNMENT. No Contract or portion thereof may be assigned without consent of the City Council, except that the CONTRACTOR may assign money due or which will accrue to it under the Contract. If given written notice, such assignment will be recognized by the City Council to the Extent permitted by law. Any assignment of money shall be subject to all property withholdings in favor of the AGENCY and to all deductions provided for in the Contract. All money withheld, whether assigned or not, shall be subject to being used by the AGENCY for completion of the Work, should the CONTRACTOR be in default.

2-3 SUBCONTRACTS.

2-3.1 General. Each Bidder shall comply with the Public Contract Code including Sections 4100 through 4113. The following excerpts or summaries of some of the requirements of this Chapter are included below for information:

The Bidder shall set forth in the Bid, as provided in 4104:

“(a) The name and location of the place of business of each subcontractor who will perform work or labor or render service to the prime CONTRACTOR in or about the construction of the work or improvement, or a subcontractor licensed by the State of California who, under subcontract to the prime CONTRACTOR, specially fabricates and installs a portion of the work or improvement according to detailed drawings contained in the plans and specifications, in an amount in excess of one-half of 1 percent of the prime CONTRACTOR's total bid, or, in the case of bids or offers for the construction of

streets or highways, including bridges, in excess of one-half of 1 percent of the prime CONTRACTOR's total bid or ten thousand dollars (\$10,000), whichever is greater."

"(b) The portion of the work which will be done by each such subcontractor under this act. The prime CONTRACTOR shall list only one subcontractor for each such portion as is defined by the prime CONTRACTOR in his bid."

Subcontracting of more than one-half of one percent of the work for which no Subcontractor was designated in the original Bid will be allowed only in cases of public emergency or necessity and only after the Engineer makes a written finding of circumstances constituting public emergency or necessity.

The CONTRACTOR must obtain written consent of the City Council to substitute a Subcontractor designated in the original Bid, to permit any subcontract to be assigned or transferred, or to otherwise allow a subcontract to be performed by anyone other than the originally designated Subcontractor.

A violation of any of the above provisions will be considered a violation of the Contract, and the City may cancel the Contract and collect appropriate damages or assess the CONTRACTOR a penalty of not more than ten (10) percent of the subcontract involved.

If subcontracted work is not being performed in a satisfactory manner, the City will notify the CONTRACTOR of the need to take corrective action and the Engineer may report the facts to the City Council. Upon order by City Council and the CONTRACTOR's receipt of written instructions from the Engineer, the Subcontractor shall immediately be removed from the Work and may not again be employed on the Work.

2-3.2 Additional Responsibility. The CONTRACTOR shall give personal attention to the fulfillment of the Contract and shall keep the Work under its control.

The CONTRACTOR shall perform, with its own organization, Contract work amounting to at least 50 percent of the Contract Price except that any designated "Specialty Items" may be performed by subcontract and the amount of any such "Specialty Items" so performed may be deducted from the Contract Price before computing the amount required to be performed by the CONTRACTOR with its own organization. "Specialty Items" will be identified by the AGENCY in the Bid or Proposal. Where an entire item is subcontracted, the value of work subcontracted will be based on the Contract Unit Price. When a portion of an item is subcontracted, the value of work subcontracted will be based on the estimated percentage of the Contract Unit Price. This will be determined from information submitted by the CONTRACTOR, and subject to approval by the Engineer.

Before the work of any Subcontractor is started, the CONTRACTOR shall submit to the Engineer for approval a written statement showing the work to be subcontracted giving the name and business of each Subcontractor and description and value of each portion of the work to be so subcontracted.

2-3.3 Status of Subcontractors. All persons engaged in the Work, including Subcontractors and their employees, will be considered employees of the CONTRACTOR. The CONTRACTOR will be held responsible for their work. The AGENCY will deal directly and solely with the CONTRACTOR and make all payments to the CONTRACTOR.

2-4 CONTRACT BONDS. Before execution of the Contract, the Bidder shall file surety bonds with the AGENCY to be approved by the City Council in the amounts and for the purposes noted below. Bond issued by a surety who is listed in the latest version of U.S. Department of Treasury Circular 570, who is authorized to issue bonds in California, and whose bonding limitation shown in said circular is sufficient to provide bonds in the amount required by the Contract shall be deemed to be approved unless specifically rejected by the AGENCY. Bonds from all other sureties shall be accompanied by all of the documents enumerated in Code of Civil Procedure 995.660(a). The Bidder shall pay all bond premiums, costs, and incidentals.

Each bond shall incorporate, by reference, the Contract and be signed by both the Bidder and Surety and the signature of the authorized agent of the Surety shall be notarized.

The Bidder shall provide two good and sufficient surety bonds. The "Payment Bond" (Materials and Labor Bond) shall be for not less than 100 percent of the Contract Price, to satisfy claims of materials suppliers and mechanics and laborers employed by it on the Work. The bond shall be maintained by the CONTRACTOR in full force and effect until the Work is accepted by the AGENCY and until all claims for materials and labor are paid, and shall otherwise comply with the Civil Code.

The "Performance Bond" shall be for 100 percent of the Contract Price to guaranty faithful performance of all work, within the time prescribed, in manner satisfactory to the AGENCY, and that all materials and workmanship will be free from original or developed defects. The bond must remain in effect until the end of all warranty periods set forth in the Contract.

Should any bond become insufficient, the CONTRACTOR shall renew the bond within 10 days after receiving notice from the AGENCY.

Should any Surety at any time be unsatisfactory to the City Council, notice will be given the CONTRACTOR to that effect. No further payments shall be deemed due or will be made under the Contract until a new Surety shall qualify and be accepted by the City Council.

Changes in the Work or extensions of time, made pursuant to the Contract, shall in no way release the CONTRACTOR or Surety from its obligations. Notice of such changes or extensions shall be waived by the Surety.

The PAYMENT BOND shall remain in force until thirty-five (35) calendar days after the date of recordation of the Notice of Completion. The FAITHFUL PERFORMANCE BOND shall remain in force until the date of recordation of the Notice of Completion. The MAINTENANCE BOND shall remain in force until one (1) year after the date of recordation of the Notice of Completion.

All bonds must be accompanied by a Power of Attorney.

2-5 PLANS AND SPECIFICATIONS.

2-5.1 General. The CONTRACTOR shall keep at the Work site a copy of the Plans and Specifications, to which the Engineer shall have access at all times.

The Plans, Specifications, and other Contract Documents shall govern the Work. The Contract Documents are intended to be complementary and cooperative. Anything specified in the Specifications and not shown on the Plans, or shown on the Plans and not specified in the Specifications, shall be as though shown on or specified in both.

The Plans shall be supplemented by such working drawings and shop drawings and are necessary to adequately control the Work.

The CONTRACTOR shall ascertain the existence of any conditions affecting the cost of the Work through a reasonable examination of the Work site prior to submitting the Bid.

Existing improvements visible at the Work site, for which no specific disposition is made on the Plans, but which interfere with the completion of the Work, shall be removed and disposed of by the CONTRACTOR.

The CONTRACTOR shall, upon discovering any error or omission in the Plans or Specifications, immediately call it to the attention of the Engineer.

All final locations determined in the field, and any deviations from the Plans and Specification, shall be marked in red on the documents to show the as-built conditions. CONTRACTOR shall maintain a complete and accurate record of all changes of construction from that shown in these plans and specifications for the purpose of providing a basis for construction record drawings. No changes shall

be made without prior written approval of the Engineer. Upon completion of the Project, CONTRACTOR shall deliver this record of all construction changes to the Engineer along with a letter which declares that other than these noted changes “the Project was constructed in conformance with the Contract Documents.” Final payment will not be made until this requirement is met.

As the figured dimensions shown on the drawings and in the specifications of the Contract may not in every case agree with scaled dimensions, the figured dimensions shall be followed in preference to the scaled dimensions, and drawings to a large scale shall be followed in preference to the drawings to a small scale. Should it appear that the work to be performed, or any related matter, are not sufficiently detailed or explained in the Contract documents, the CONTRACTOR shall apply to the Engineer for such further explanations as necessary, and shall conform to such further explanations provided by the Engineer as part of the Contract to the extent that it is consistent with the terms of the Contract.

Caution: The engineer preparing these plans will not be responsible or liable for unauthorized changes to or uses of these plans. All changes to the plans must be approved in writing by the Engineer.

2-5.1.1 Records of Construction Changes/As-Built. CONTRACTOR shall maintain a complete and accurate record of all changes of construction from that shown in these Plans and Specifications for the purpose of providing a basis for construction record drawings. No changes shall be made without prior written approval of the City Engineer.

Upon completion of the Project, CONTRACTOR shall deliver this record of all construction changes to the Engineer along with a letter which declares that other than these noted changes that Project was constructed in conformance with the Contract Documents.

Caution: The engineer preparing these Plans will not be responsible for, or liable for, unauthorized changes to or uses of these Plans. All changes to the Plans must be approved in writing by City Engineer.

2-5.2 Precedence of Contract Documents. If there is a conflict between any of the Contract Documents, the document highest in precedence shall control. The precedence shall be as follows:

- 1) Permits issued by jurisdictional regulatory agencies.
- 2) Change Orders and/or Supplemental Agreements; whichever occurs last.
- 3) Contract/Agreement
- 4) Addenda.
- 5) Bid/Proposal.
- 6) Special Provisions.
- 7) Plans.
- 8) Standard Plans.
- 9) Standard Specifications.
- 10) Reference Specifications.

Detail drawings take precedence over general drawings.

2-5.3 Submittals.

2-5.3.1 General. Submittals shall be provided, at the CONTRACTOR’s expense, as required in 2-5.3.2, 2-5.3.3 and 2-5.3.4, when required by the Plans or Special Provisions, or when requested by the Engineer.

Materials shall neither be furnished nor fabricated, nor shall any work for which submittals are required be performed, before the required submittals have been reviewed and accepted by the Engineer. Neither review nor acceptance of submittals by the Engineer shall relieve the CONTRACTOR from responsibility for errors, omissions, or deviations from the Contract Documents, unless such deviations were specifically called to the attention of the Engineer in the letter of transmittal. The CONTRACTOR shall be responsible for the correctness of the submittals.

The CONTRACTOR shall allow a minimum of 20 working days for review of submittals unless otherwise specified in the Special Provisions. Each submittal shall be accompanied by a letter of transmittal.

2-5.3.2 Working Drawings. Working drawings are drawings showing details not shown on the Plans which are required to be designed by the CONTRACTOR. Working drawings shall be of a size and scale to clearly show all necessary details.

Six copies and one reproducible shall be submitted. If no revisions are required, three of the copies will be returned to the CONTRACTOR. If revisions are required, the Engineer will return one copy along with the reproducible for resubmission. Upon acceptance, the Engineer will return two of the copies to the CONTRACTOR and retain the remaining copies and the reproducible.

Working drawings are required in the following subsections:

[Table of working drawings]

Working drawings shall be prepared by a Civil or Structural Engineer registered by the State of California.

2-5.3.3 Shop Drawings. Shop drawings are drawings showing details of manufactured or assembled products proposed to be incorporated into the Work. Shop drawings required shall be as specified in the Special Provisions.

2-5.3.4 Supporting Information. Supporting information is information required by the Specifications for the purposes of administration of the Contract, analysis for verifications of conformance with the Specifications, the operation and maintenance of a manufactured product or system to be constructed as part of the Work, and other information as may be required by the Engineer. Six copies of the supporting information shall be submitted to the Engineer prior to the start of the Work unless otherwise specified in the Special Provisions or directed by the Engineer. Supporting information for systems shall be bound together and include all manufactured items for the system. If resubmittal is not required, three copies will be returned to the CONTRACTOR. Supporting information shall consist of the following and is required unless otherwise specified in the Special Provisions:

- 1) List of Subcontractors per 2-3.2.
- 2) List of Materials per 4-1.4.
- 3) Certifications per 4-1.5.
- 4) Construction Schedule per 6-1.
- 5) Confined Space Entry Program per 7-10.4.4.
- 6) Concrete mix designs per 201-1.1
- 7) Asphalt concrete mix designs per 203-6.1.
- 8) Data, including, but not limited to, catalog sheets, manufacturer's brochures, technical bulletins, specifications, diagrams, product samples, and other information necessary to describe a system, product or item. This information is

required for irrigation systems, street lighting systems, and traffic signals, and may also be required for any product, manufactured item, or system.

2-6 WORK TO BE DONE. The CONTRACTOR shall perform all work necessary to complete the Contract in a satisfactory manner. Unless otherwise provided, the CONTRACTOR shall furnish all materials, equipment, tools, labor, and incidentals necessary to complete the Work.

Any plan or method of work suggested by the AGENCY or the Engineer to the CONTRACTOR but not specified or required, if adopted or followed by the CONTRACTOR in whole or in part, shall be used at the risk and responsibility of the CONTRACTOR; and the AGENCY and the Engineer shall assume no responsibility therefore and in no way be held liable for any defects in the work which may result from or be caused by use of such plan or method of work.

2-7 SUBSURFACE DATA. All soil and test hole data, water table elevations, and soil analyses shown on the drawings or included in the Specifications apply only at the location of the test holes and to the depths indicated. Soil test reports for test holes which have been drilled are available for inspection at the office of the Engineer. Any additional subsurface exploration shall be done by Bidder or the CONTRACTOR at their own expenses.

2-8 RIGHT-OF-WAY. Rights-of-way, easements, or rights-of-entry for the Work will be provided by the AGENCY. Unless otherwise provided, the CONTRACTOR shall make arrangements, pay for, and assume all responsibility for acquiring, using, and disposing of additional work areas and facilities temporarily required. The CONTRACTOR shall indemnify and hold the AGENCY harmless from all claims for damages caused by such actions.

When the CONTRACTOR arranges for additional work areas and facilities temporarily required by him/her, he/she shall provide the AGENCY with proof that the additional work areas and/or facilities have been left in a condition satisfactory to the owner(s) of said work areas and/or facilities prior to acceptance of the work.

2-9 SURVEYING. The CONTRACTOR will provide all necessary construction surveying, staking or markings for locating the limits of construction and shall comply with the provisions of 2-9 of these Standard Specifications. The CONTRACTOR shall bear all costs for restaking or marking.

Construction surveys shall be done only under the direction of the Engineer by a Registered (licensed) Land Surveyor or a Registered Civil Engineer authorized to practice land surveying within the state. The AGENCY will provide available record map information. The CONTRACTOR is responsible for obtaining all necessary record maps, centerline ties and survey notes from Los Angeles County.

The CONTRACTOR and his surveyor shall provide the Engineer with a copy of the constructing staking field notes used to construct the improvements. In addition the CONTRACTOR shall also prove a plot of the improvements to be constructed based on the surveyor's construction staking and markings prior to the installation of the improvements. The plot shall be the same scale as the improvement plans.

2-9.1 Permanent Survey Markers. The CONTRACTOR shall notify the Engineer, or the owner on a Private Contract, at least 7 days before starting work to allow for the preservation of survey monuments, lot stakes (tagged), and bench marks.

The CONTRACTOR shall protect existing survey monuments, if any exist within the work limits, during the entire project. Asphalt overlaying of existing survey monuments in the roadway will not be permitted. In the event a surveyed monument lies within an area to be cold planed, removed or reconstructed, the CONTRACTOR shall immediately notify the AGENCY's representative and protect said monument until the monument is relocated.

The CONTRACTOR shall reestablish destroyed survey monuments at the CONTRACTOR's expense.

The Engineer, or the owner at its cost, shall file a Corner Record Form referencing survey monuments subject to disturbance in the Office of the County Surveyor prior to the start of construction and also prior to the completion of construction for the replacement of survey monuments. The CONTRACTOR shall not disturb survey monuments, lot stakes (tagged), or bench marks without the consent of the Engineer or the owner on Private Contracts. The CONTRACTOR shall bear the expense of replacing any that may be disturbed without permission. Replacement shall be done only under the direction of the Engineer by Registered (licensed) Licensed Land Surveyor or a Registered Civil Engineer authorized to practice land surveying within the state.

When a change is made in the finished elevation of the pavement of any roadway in which a permanent survey monument is located, the CONTRACTOR shall adjust the monument cover to the new grade within 7 days of finished paving unless otherwise specified.

2-9.2 Survey Service. The Engineer will oversee surveying adequate for construction. The CONTRACTOR shall preserve construction survey stakes and marks for the duration of their usefulness. If any construction survey stakes are lost or disturbed and need to be replaced, such replacement shall be by the CONTRACTOR at his expense.

The CONTRACTOR shall notify the Engineer in writing at least 2 working days before survey services take place for the laying out of any portion of the Work. The CONTRACTOR shall dig all holes necessary for line and grade stakes.

Unless otherwise specified, stakes will be set and stationed by the CONTRACTOR for curbs, headers, sewers, storm drains, structures, and rough grade. A corresponding cut or fill to finished grade (or flowline) will be indicated on a grade sheet.

2-9.3 Line and Grade. The CONTRACTOR shall be responsible for all survey and layout of work.

The line and grades for construction will be parallel to and offset from the position of the work. From the established lines and grades, the CONTRACTOR shall extend the necessary lines and grades for construction of the work and shall be responsible for the correctness of same.

All work shall conform to the lines, elevations, and grades shown on the Plans.

Three consecutive points set on the same slope shall be used together so that any variation from a straight grade can be detected. Any such variation shall be reported to the Engineer. In the absence of such report, the CONTRACTOR shall be responsible for any error in the grade of the finished work.

Grades for underground conduits will be set at the surface of the ground. The CONTRACTOR shall transfer them to the bottom of the trench.

2-10 AUTHORITY OF COUNCIL AND ENGINEER. The City Council has the final authority in all matters affecting the Work. Within the scope of the Contract, the Engineer has the authority to enforce compliance with the Plans and Specifications. The CONTRACTOR shall promptly comply with instructions from the Engineer or an authorized representative.

The decision of the Engineer is final and binding on all questions relating to: quantities; acceptability of materials, equipment, or work; execution, progress or sequence of work; and interpretation of the Plans, Specifications, or other drawings. This shall be precedent to any payment under the Contract, unless otherwise ordered by the City Council.

2-11 INSPECTION. The Work is subject to inspection and approval by the Engineer. The CONTRACTOR shall notify the Engineer before noon of the working day before inspection is required. Work shall be done only in the presence of the Engineer, unless otherwise authorized. Any work done without proper inspection will be subject to rejection. The Engineer and any authorized representatives shall at all times have access to the Work during its construction at shops and yards as well as the project site. The CONTRACTOR shall provide every reasonable facility for ascertaining that the materials and workmanship are in accordance

with these specifications. Inspection of the Work shall not relieve the CONTRACTOR of the obligation to fulfill all conditions of the Contract.

The AGENCY shall inspect for compliance with requirements for 8-hour days and 40-hour weeks on normal working days. The CONTRACTOR shall reimburse the AGENCY, at rates established by the AGENCY, for any additional inspection, including inspection on legal holidays.

SECTION 3 – CHANGES IN WORK

3-1 CHANGES REQUESTED BY THE CONTRACTOR.

3-1.1 General. Changes in the Plans and Specifications, requested in writing by the CONTRACTOR, which do not materially affect the Work and which are not detrimental to the Work or to the interests of the AGENCY, may be granted by the Engineer. Nothing herein shall be construed as granting a right to the CONTRACTOR to demand acceptance of such changes.

3-1.2 Payment for Changes Requested by the CONTRACTOR. If such changes are granted, they shall be made at a reduction in cost or no additional cost to the AGENCY.

3-2 CHANGES INITIATED BY THE AGENCY.

3-2.1 General. The AGENCY may change the Plans, Specifications, character of the work, or quantity of work provided the total arithmetic dollar value of all such changes, both additive and deductive, does not exceed 25 percent of the Contract Price. Should it become necessary to exceed this limitation, the change shall be by written Supplemental Agreement between the CONTRACTOR and AGENCY, unless both parties agree to proceed with the change by Change Order.

Change Orders shall be in writing and state the dollar value of the change or establish the method of payment, any adjustment in the Contract time of completion, and when negotiated prices are involved, shall provide for the CONTRACTOR's signature indicating acceptance.

3-2.2 Contract Unit Prices.

3-2.2.1 General. If a change is ordered in an item of work covered by a Contract Unit Price, and such change does not involve substantial change in character of the work from that shown on the Plans or specified in the Specifications, then an adjustment in payment will be made. This adjustment will be based upon the increase or decrease in quantity and the Contract Unit Price.

If the actual quantity of an item of work covered by Contract Unit Price and constructed in conformance with the Plans and Specifications varies from the Bid quantity by 25 percent or less, payment will be made at the Contract Unit Price. If the actual quantity of said item of work varies from the Bid quantity by more than 25 percent, payment will be made per 3-2.2.2 or 3-2.2.3 as appropriate.

If a change is ordered in an item of work covered by a Contract Unit Price, and such change does involve a substantial change in the character of the work from that shown on the Plans or specified in the Specifications, an adjustment in payment will be made per 3-2.4.

3-2.2.2 Increases of More than 25 Percent. Should the actual quantity of an item of work covered by a Contract Unit Price and constructed in conformance with the Plans and Specifications, exceed the Bid quantity by more than 25 percent, payment for the quantity in excess of 125 percent of the Bid quantity will be made on the basis of an adjustment in the Contract Unit Price mutually agreed to by the CONTRACTOR and the AGENCY, or at the option of the Engineer, on the basis of Extra Work per 3.3.

The Extra Work per 3-3, basis of payment, shall not include fixed costs. Fixed costs shall be deemed to have been recovered by the CONTRACTOR through payment for 125 percent of the Bid quantity at the Contract Unit Price.

3-2.2.3 Decreases of More Than 25 Percent. Should the actual quantity of an item of work covered by a Contract Unit Price, and constructed in conformance with the Plans and Specifications, be less than 75 percent of the Bid quantity, an adjustment in payment will not be made unless so requested in writing by the CONTRACTOR. If the CONTRACTOR so requests, payment will be made on the basis of an adjustment in the Contract Unit Price mutually agreed to by the CONTRACTOR and the AGENCY, or at the option of the Engineer, on the basis of Extra Work per 3.3; however, in no case will payment be less than would be made for the actual quantity at the Contract Unit Price nor more than would be made for 75 percent of the Bid quantity at the Contract Unit Price.

3-2.3 Stipulated Unit Prices. Stipulated Unit Prices are unit prices established by the AGENCY in the Contract Documents. Stipulated Unit Prices may be used for the adjustment of Contract changes when so specified in the Special Provisions.

3-2.4 Agreed Prices. Agreed Prices are prices for new or unforeseen work, or adjustments in Contract Unit Prices per 3-2.2, established by mutual agreement between the CONTRACTOR and the AGENCY. If mutual agreement cannot be reached, the Engineer may direct the CONTRACTOR to proceed on the basis of Extra Work in accordance per 3-3, except as otherwise specified in 3-2.2.2 and 3-2.2.3.

3-2.5 Eliminated Items. Should any Bid item be eliminated in its entirety, payment will be made to the CONTRACTOR for its actual costs incurred in connection with the eliminated item prior to notification in writing from the Engineer so stating its elimination.

If material conforming to the Plans and Specifications is ordered by the CONTRACTOR for use in the eliminated item prior to the date of notification of elimination by the Engineer, and if the order for the material cannot be canceled, payment will be made to the CONTRACTOR for the actual cost of the materials. In this case, the material shall become the property of the AGENCY. Payment will be made to the CONTRACTOR for its actual costs for any further handling. If the material is returnable, the materials shall be returned and payment will be made to the CONTRACTOR for the actual cost of charges made by the supplier for returning the material and for handling by the CONTRACTOR.

Actual costs, as used herein, shall be computed on the basis of Extra Work per 3-3.

3-3 EXTRA WORK.

3-3.1 General. New or unforeseen work will be classified as “extra work” when the Engineer determines that it is not covered by the Contract Unit Prices or stipulated unit prices.

3-3.2 Payment.

3-3.2.1 General. When the price for the extra work cannot be agreed upon, the AGENCY will pay for the extra work based on the accumulation of costs as provided herein.

3-3.2.2 Basis for Establishing Costs.

(a) Labor. The costs of labor will be the actual costs for wages of workers performing the extra work at the time the extra work is done, plus employer payments of payroll taxes, workers compensation insurance, liability insurance, health and welfare, pension, vacation, apprenticeship funds, and other direct costs, resulting from Federal, State, or local laws, as well as assessments or benefits required by lawful collection bargaining agreements.

The use of a labor classification which would increase the extra work cost will not be permitted unless the CONTRACTOR establishes the necessity for such additional costs. Labor costs for

equipment operators and helpers shall be reported only when such costs are not included in the invoice for equipment rental. The labor costs for foremen shall be proportioned to all of their assigned work and only that applicable to extra work will be paid.

Nondirect labor costs, including superintendence, shall be considered part of the markup of 3-3.2.3(a).

(b) Materials. The cost of materials reported shall be at invoice or lowest current price at which such materials are locally available and delivered to the job site in the quantities involved, plus sales tax, freight, and delivery.

The AGENCY reserves the right to approve materials and sources of supply, or to supply materials to the CONTRACTOR if necessary for the progress of the Work. No markup shall be applied to any materials provided by the AGENCY.

(c) Tool and Equipment Rental. No payment will be made for the use of tools which have a replacement value of \$200 or less.

Regardless of ownership, the rates to be used in determining equipment rental costs shall not exceed listed rates prevailing locally at equipment rental agencies, or distributors, at the time the work is performed.

The rental rates paid shall include the cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance, and all incidentals. Necessary loading and transportation costs for equipment used on the extra work shall be included.

If equipment is used intermittently and, when not in use, could be returned to its rental source at less expense to the AGENCY than holding it at the Work site, it shall be returned, unless the CONTRACTOR elects to keep it at the Work site, at no expense to the AGENCY.

All equipment shall be acceptable to the Engineer, in good working condition, and suitable for the purpose for which it is to be used. Manufacturer's ratings and approved modifications shall be used to classify equipment and it shall be powered by a unit of at least the minimum rating recommended by the manufacturer.

The reported rental time for equipment already at the Work site shall be the duration of its use on the extra work. This time begins when equipment is first put into actual operation on the extra work, plus the time required to move it from its previous site and back, or to a closer site.

(d) Other Items. The AGENCY may authorize other items which may be required on the extra work, including labor, services, materials, and equipment. These items must be different in their nature from those required for the Work, and be of a type not ordinarily available from the CONTRACTOR or Subcontractors.

Invoices covering all such items in detail shall be submitted with the request for payment.

(e) Invoices. Vendors' invoices for materials, equipment rental and other expenditures shall be submitted with the request for payment. If the request for payment is not substantiated by invoices or other documentation, the AGENCY may establish the cost of the item involved at the lowest price which was current at the time of the report.

3-3.2.3 Markup.

(a) Work by CONTRACTOR. Unless otherwise provided in the Special Provisions, a reasonable allowance for overhead and profit shall be added to the CONTRACTOR's costs as determined under 3-3.2.2 and shall constitute the markup for all overhead and profit on work by

the CONTRACTOR. The CONTRACTOR shall also be compensated for the actual increase in the CONTRACTOR's bond premium caused by the extra work.

(b) Work by Subcontractor. When any of the extra work is performed by a Subcontractor, the markup established in 303.2.3(a) shall be applied to the Subcontractor's costs as determined under 3-3.2.2. Unless otherwise provided in the Special Provisions, a reasonable allowance for the CONTRACTOR's overhead and profit shall be added to the sum of the Subcontractor's costs and markup and shall constitute the markup for all overhead and profit for the CONTRACTOR on work by the Subcontractor.

3-3.3 Daily Reports by CONTRACTOR. When the price for the extra work cannot be agreed upon, the CONTRACTOR shall submit a daily report to the Engineer on forms approved by the AGENCY. Included are applicable delivery tickets, listing all labor, materials, and equipment involved for that day, and other services and expenditures when authorized. Failure to submit the daily report by the close of the next working day may waive any rights for that day. An attempt shall be made to reconcile the report daily, and it shall be signed by the Engineer and the CONTRACTOR. In the event of disagreement, pertinent notes shall be entered by each party to explain points which cannot be resolved immediately. Each party shall retain a signed copy of the report. Reports by Subcontractors or others shall be submitted through the CONTRACTOR.

The report shall:

1. Show names of workers, classifications, and hours worked.
2. Describe and list quantities of materials used.
3. Show type of equipment, size, identification number, and hours of operations, including loading and transportation, if applicable.
4. Describe other services and expenditures in such detail as the AGENCY may require.

3-4 CHANGED CONDITIONS. The CONTRACTOR shall promptly notify the Engineer of the following Work site conditions (hereinafter called changed conditions), in writing, upon their discovery and before they are disturbed.

1. Subsurface or latent physical conditions differing materially from those represented in the Contract;
2. Unknown physical conditions of an unusual nature differing materially from those ordinarily encountered and generally recognized as inherent in work of the character being performed; and
3. Material differing from that represented in the Contract which the CONTRACTOR believes may be hazardous waste, as defined in Section 25117 of the Health and Safety Code, that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law.

The Engineer will promptly investigate conditions which appear to be changed conditions. If the Engineer determines that the conditions are changed conditions and will materially affect costs, a Change Order will be issued adjusting the compensation for such portion of the Work in accordance with 3-2.2. If the Engineer determines that conditions are changed conditions and they will materially affect performance time, the CONTRACTOR, upon submitting a written request, will be granted an extension of time subject to the provisions of 6-6.

If the Engineer determines that the conditions do not justify an adjustment in compensation, the CONTRACTOR will be notified in writing. This notice will also advise the CONTRACTOR of its obligation to notify the Engineer in writing if the CONTRACTOR disagrees.

Should the CONTRACTOR disagree with the decision, it may submit a written notice of potential claim to the Engineer before commencing the disputed work. In the event of such a dispute, the CONTRACTOR shall not be excused from any scheduled completion date provided by the Contract and shall proceed with all work to be performed under the Contract. However, the CONTRACTOR shall retain any and all rights provided by either Contract or law which pertain to the resolution of disputes and protests between the contracting parties. The CONTRACTOR shall proceed as provided in 3-5.

The CONTRACTOR's failure to give notice of changed conditions promptly upon their discovery and before they are disturbed shall constitute a waiver of all claims in connection therewith.

3-5 DISPUTED WORK. If the CONTRACTOR and the AGENCY are unable to reach agreement on disputed work, the AGENCY may direct the CONTRACTOR to proceed with the work. Payment shall be as later determined by mediation or arbitration, if the AGENCY and CONTRACTOR agree thereto, or as fixed in a court of law.

Although not to be construed as proceeding under extra work provisions, the CONTRACTOR shall keep and furnish records of disputed work in accordance with 3-3.

SECTION 4 – CONTROL OF MATERIALS

4-1 MATERIALS AND WORKMANSHIP.

4-1.1 General. All materials, parts, and equipment furnished by the CONTRACTOR in the Work shall be new, high grade, and free from defects. Quality of work shall be in accordance with the generally accepted standards. Materials and work quality shall be subject to the Engineer's approval.

Materials and work quality not conforming to the requirements of the Specifications shall be considered defective and will be subject to rejection. Defective work or material, whether in place or not, shall be removed immediately from the site by the CONTRACTOR, at its expense, when so directed by the Engineer.

If the CONTRACTOR fails to replace any defective or damaged work or materials after reasonable notice, the Engineer may cause such work or materials to be replaced. The replacement expense will be deducted from the amount to be paid to the CONTRACTOR.

Used or secondhand materials, parts, and equipment may be used only if permitted by the Specifications.

The CONTRACTOR and all subcontractors, suppliers, and vendors, shall guarantee that the entire Work will meet all requirements of this Contract as to the quality of materials, equipment, and workmanship. The CONTRACTOR, at no cost to the AGENCY, shall make any repairs or replacements made necessary by defects in materials, equipment, or workmanship that become evident within one year after the date of recordation of the Notice of Completion. Within this one year period, the CONTRACTOR shall also restore to full compliance with the requirements of this Contract any portion of the Work which is found not to meet those requirements. The CONTRACTOR shall defend, indemnify, and hold the AGENCY, its officers, agents, and employees harmless from claims of any kind due to injuries or damages arising, directly or indirectly, from said defects or noncompliance.

The CONTRACTOR shall make all repairs, replacements, and restorations within thirty-five (35) days after the date of the Engineer's written notice.

If, in the opinion of the Engineer, the defective work is not of sufficient magnitude or importance to make the work dangerous or undesirable, or if, in the opinion of the Engineer, the removal of such work is impractical or will create conditions which are dangerous or undesirable, the AGENCY shall have the right and authority to retain such work instead of requiring it to be removed and reconstructed, but

will make such deductions thereof in the payments due or to become due to the CONTRACTOR as the AGENCY may deem just and reasonable.

4-1.2 Protection of Work and Materials. The CONTRACTOR shall provide and maintain storage facilities and employ such measures as will preserve the specified quality and fitness of materials to be used in the Work. Stored materials shall be reasonably accessible for inspection. The CONTRACTOR shall also adequately protect new and existing work and all items of equipment for the duration of the Contract.

The CONTRACTOR shall not, without the AGENCY's consent, assign, sell, mortgage, hypothecate, or remove equipment or materials which have been installed or delivered and which may be necessary for the completion of the Contract.

4-1.3 Inspection Requirements.

4-1.3.1 General. Unless otherwise specified, inspection is required at the source for such typical materials and fabricated items as bituminous paving mixtures, structural concrete, metal fabrication, metal casting, welding, concrete pipe manufacture, protective coating application, and similar shop or plant operations.

Steel pipe in sizes less than 450 mm (18 inches) and vitrified clay and cast iron pipe in all sizes are acceptable upon certification as to compliance with the specifications, subject to sampling and testing by the AGENCY. Standard items of equipment such as electric motors, conveyors, elevators, plumbing fixtures, etc., are subject to inspection at the job site only. Special items of equipment such as designed electrical panel boards, large pumps, sewage plant equipment, etc., are subject to inspection at the source, normally only for performance testing. The Specifications may require inspection at the source for other items not typical of those listed in this section.

4-1.3.2 Inspection of Materials Not Locally Produced. When the CONTRACTOR intends to purchase materials, fabricated products, or equipment from sources located more than 80 km (50 miles) outside the geographical limits of the AGENCY, an inspector or accredited testing laboratory (approved by the Engineer), shall be engaged by the CONTRACTOR at its expense, to inspect the materials, equipment or process. This approval shall be obtained before producing any material or equipment. The inspector or representative of the testing laboratory shall judge the materials by the requirements of the Plans and Specifications. The CONTRACTOR shall forward reports required by the Engineer. No materials or equipment shall be shipped nor shall any processing, fabrication or treatment of such materials be done without proper inspection by the approved agent. Approval by said agent shall not relieve the CONTRACTOR of responsibility for complying with the Contract requirements.

4-1.3.3 Inspection by the AGENCY. The AGENCY will provide all inspection and testing laboratory services within 80 km (50 miles) of the geographical limits of the AGENCY. For private contracts, all costs of inspection at the source, including salaries and mileage costs, shall be paid by the permittee.

4-1.4 Test of Materials. Before incorporation in the Work, the CONTRACTOR shall submit samples of materials, as the Engineer may require, at no cost to the AGENCY. The CONTRACTOR, at its expense, shall deliver the materials for testing to the place and at the time designated by the Engineer. Except as elsewhere specified, the AGENCY will bear the cost of testing material and/or workmanship which meet or exceed the requirements indicated in the Standard Specifications and the Special Provisions. The CONTRACTOR shall bear the cost of all other tests, including the retesting of material or workmanship that fails to pass the first test.

The CONTRACTOR shall notify the Engineer in writing, at least 15 days in advance, of its intention to use materials for which tests are specified, to allow sufficient time to perform the tests. The notice shall name the proposed supplier and source of material.

If the notice of intent to use is sent before the materials are available for testing or inspection, or is sent so far in advance that the materials on hand at the time will not last but will be replaced by a new lot prior to use on the Work, it will be the CONTRACTOR's responsibility to renotify the Engineer when samples which are representative may be obtained.

There will be inspection of this project to ensure strict adherence to these specifications. During the course of work, CONTRACTOR shall be responsible for calling the Project Engineer for testing and inspection (48) hours in advance. Work not properly tested and inspected will be subject to rejection.

Any work done in unauthorized areas or in a manner unacceptable to the inspector may not be accepted and/or paid for.

4-1.5 Certification. The Engineer may waive materials testing requirements of the Specifications and accept the manufacturer's written certification that the materials to be supplied meet those requirements. Materials test data may be required as part of the certification.

4-1.6 Trade Names or Equals. The CONTRACTOR may supply any of the materials specified or offer an equivalent. The Engineer shall determine whether the material offered is equivalent to that specified. Adequate time shall be allowed for the Engineer to make this determination.

Whenever any particular material, process, or equipment is indicated by patent, proprietary or brand name, or by name of manufacturer, such wording is used for the purpose of facilitating its description and shall be deemed to be followed by the words **or equal**. A listing of materials is not intended to be comprehensive, or in order of preference. The CONTRACTOR may offer any material, process, or equipment considered to be equivalent to that indicated. Approval of equipment and materials offered as equivalents to those specified must be obtained prior to the opening of bids as set forth in the Instructions to Bidders.

The CONTRACTOR shall, at its expense, furnish data concerning items offered by it as equivalent to those specified. The CONTRACTOR shall have the material tested as required by the Engineer to determine that the quality, strength, physical, chemical, or other characteristics, including durability, finish, efficiency, dimensions, service, and suitability are such that the item will fulfill its intended function.

Test methods shall be subject to the approval of the Engineer. Test results shall be reported promptly to the Engineer, who will evaluate the results and determine if the substitute item is equivalent. The Engineer's findings shall be final. Installation and use of a substitute item shall not be made until approved by the Engineer.

If a substitute offered by the CONTRACTOR is not found to be equal to the specified material, the CONTRACTOR shall furnish and install the specified material.

The specified Contract completion time shall not be affected by any circumstance developing from the provisions of this section.

Along with information supplied by the CONTRACTOR regarding equivalency of the proposed item, the CONTRACTOR shall clearly identify all deviations from the specified item. Deviations discovered by the Engineer after acceptance of an "or equal" item which were not identified by the CONTRACTOR with his/her submittal shall be cause for rejection of the "or equal" item. CONTRACTOR shall be due no additional compensation in time or money for acceptance or rejection of a proposed "or equal" item and subsequent replacement with the item specified. CONTRACTOR shall pay cost to AGENCY for items requiring more than two submittals and analysis of any shop drawing which requires more than a general review of an "or equal" item.

4-1.7 Weighing and Metering Equipment. All scales and metering equipment used for proportioning materials shall be inspected for accuracy and certified within the past 12 months by the State of California Bureau of Weights and Measures, by the County Director or Sealer of Weights and Measures, or by a scale mechanic registered with or licensed by the County.

The accuracy of the work of a scale service AGENCY, except as stated herein, shall meet the standards of the California Business and Professions Code and the California Code of Regulations pertaining to weighing devices. A certificate of compliance shall be presented, prior to operation, to the Engineer for approval and shall be renewed whenever required by the Engineer at no cost to the AGENCY.

All scales shall be arranged so they may be read easily from the operator's platform or area. They shall indicate the true net weight without the application of any factor. The figures of the scales shall be clearly legible. Scales shall be accurate to within 1 percent when tested with the plant shut down. Weighing equipment shall be so insulated against vibration or moving of other operating equipment in the plant area that the error in weighing with the entire plant running will not exceed 2 percent for any setting nor 1.5 percent for any batch.

4-1.8 Calibration of Testing Equipment. Testing equipment, such as, but not limited to pressure gages, metering devices, hydraulic systems, force (load) measuring instruments, and strain-measuring devices shall be calibrated by a testing AGENCY acceptable to the Engineer at intervals not to exceed 12 months and following repairs, modification, or relocation of the equipment. Calibration certificates shall be provided when requested by the Engineer.

4-1.9 Construction Materials Dispute Resolution (Soils, Rock Materials, Concrete, Mortar and Related Materials, Masonry Materials, Bituminous Materials, Rock Products, and Modified Asphalts). In the interest of safety and public value, whenever credible evidence arises to contradict the test values of materials, the AGENCY and the CONTRACTOR will initiate an immediate and cooperative investigation. Test values of materials are results of the materials' tests, as defined by these Specifications or by the special provisions, required to accept the Work. Credible evidence is process observations or test values gathered using industry accepted practices. A contradiction exists whenever work acceptance or performance becomes suspect. The investigation shall allow access to all test results, procedures, and facilities relevant to the disputed work and consider all available information and, when necessary, gather new and additional information in an attempt to determine the validity, the cause, and if necessary, the remedy to the contradiction. If the cooperative investigation reaches any resolution mechanism acceptable to both the AGENCY and the CONTRACTOR, the contradiction shall be considered resolved and the cooperative investigation concluded.

Whenever the cooperative investigation is unable to reach resolution, the investigation may then either conclude without resolution or continue by written notification of one party to the other requesting the implementation of a resolution process by committee. The continuance of the investigation shall be contingent upon recipient's agreement and acknowledged in writing within 3 calendar days after receiving a request. Without acknowledgement, the investigation shall conclude without resolution. The committee shall consist of three State of California Registered Civil Engineers. Within 7 calendar days after the written request notification, the AGENCY and the CONTRACTOR will each select one engineer. Within 14 calendar days of the written request notification, the two selected engineers will select a third engineer. The goal in selection of the third member is to complement the professional experience of the first two engineers. Should the two engineers fail to select the third engineer, the AGENCY and the CONTRACTOR shall each propose 2 engineers to be the third member within 21 calendar days after the written request notification. The first two engineers previously selected shall then select one of the court proposed engineers in a blind draw.

The committee shall be a continuance of the cooperative investigation and will re-consider all available information and if necessary gather new and additional information to determine the validity, the cause, and if necessary, the remedy to the contradiction. The committee will focus upon the performance

adequacy of the material(s) using standard engineering principles and practices and to ensure public value, the committee may provide engineering recommendations as necessary. Unless otherwise agreed, the committee will have 30 calendar days from its formation to complete their review and submit their findings. The final resolution of the committee shall be by majority opinion, in writing, stamped and signed. Should the final resolution not be unanimous, the dissenter may attach a written, stamped, and signed minority opinion.

Once started, the resolution process by committee shall continue to full conclusion unless:

1. Within 7 days of the formation of the committee, the AGENCY and the CONTRACTOR reach an acceptable resolution mechanism; or
2. Within 14 days of the formation of the committee, the initiating party withdraws its written notification and agrees to bear all investigative related costs thus far incurred; or
3. At any point by the mutual agreement of the AGENCY and the CONTRACTOR.

Unless otherwise agreed, the CONTRACTOR shall bear and maintain a record for all the investigative costs until resolution. Should the investigation discover assignable causes for the contradiction, the assignable party, the AGENCY or the CONTRACTOR, shall bear all costs associated with the investigation. Should assignable causes for the contradiction extended to both parties, the investigation will assign costs cooperatively with each party or when necessary, equally. Should the investigation substantiate a contradiction without assignable cause, the investigation will assign costs cooperatively with each party or when necessary, equally. Should the investigation be unable to substantiate a contradiction, the initiator of the investigation shall bear all investigative costs. All claim notification requirements of the contract pertaining to the contradiction shall be suspended until the investigation is concluded.

SECTION 5 – UTILITIES

5-1 LOCATION. The Permittee (in the case of Private Contracts) and the AGENCY, will search known substructure records and furnish the CONTRACTOR with copies of documents which describe the location of utility substructures, or will indicate on the Plans for the project those substructures (except for service connections) which may affect the Work. Information regarding removal, relocation, abandonment, or installation of new utilities will be furnished to prospective bidders.

Where underground main distribution conduits such as water, gas, sewer, electric power, telephone, or cable television are shown on the Plans, the CONTRACTOR shall assume that every property parcel will be served by a service connection for each type of utility.

As provided in Section 4216 of the California Government Code, at least 2 working days prior to commencing any excavation, the CONTRACTOR shall contact the regional notification center (Underground Service Alert of Northern California) and obtain an inquiry identification number.

The California Department of Transportation is not required by Section 4216 to become a member of the regional notification center. The CONTRACTOR shall contact it for location of its subsurface installations.

The CONTRACTOR shall determine the location and depth of all utilities, including service connections, which have been marked by the respective owners and which may affect or be affected by its operations. If no pay item is provided in the Contract for this work, full compensation for such work shall be considered as included in the prices bid for other items of work.

5-1.1 Mandatory Notification Prior To Excavation. The Contractor's attention is directed to Section 4215.5 through 4217 of the Government Code of the State of California. This requires that two (2) working days prior to commencing any excavation "Underground Service Alert of Northern California" (USA) shall be notified by phone, toll free 1-800-227-2600, for the assignment of an Inquiry Identification Number.

Construction CONTRACTOR shall contact all utility companies at least five (5) working days prior to commencing work and shall verify the location of any known utilities and determine whether or not a representative of each company will be present during excavation.

The known public utilities contacts are:

1. City of Auburn – sewer and storm drain;
Address-1225 Lincoln Way, Auburn, CA 95603
Tel- 530-823-4211
2. Placer County Water Agency (PCWA) – water;
Address-144 Ferguson Road, P.O. Box 6570, Auburn, CA95604
Tel - 530-823-4850
3. PG&E – gas and electric
Address- 343 Sacramento Street, Auburn, CA 95603
Tel – 530-889-3190
4. AT&T – telephone and fiber optic
Address- 2823 Bell Road, Auburn, CA 95603
Tel - 530-885-7702, 800-288-2020
5. WAVE Broadband – cable and fiber optic
Address- 1015 Lincoln way, Auburn, CA 95603
Tel - 866-928-3123

The CONTRACTOR shall coordinate construction with public utility relocation activities.

The existing subsurface utilities shown have been indicated, based on the best available record information. However, to avoid or resolve any interference problems between these existing utilities and the proposed work, the CONTRACTOR shall field verify the vertical and horizontal locations of all utilities, such as water lines and water services, electronic conduits, telephone and television cable, storm drain facilities, and all other facilities and obstructions prior to beginning any excavations. If conflicts exist, revised grades and/or alignments may be established, if required. **Such field verification shall require exposing these utilities prior to the start of construction.**

Special reference is hereby made to Section 5-2, “Protection,” of these Standard Specifications with respect to the protection, repair, and replacement of existing subsurface utilities.

Additionally, the CONTRACTOR shall also notify the following local entities of his/her schedule fourteen (14) days prior to commencing work, including local refuse collectors, street sweepers, the Post Office, Public Schools, and Bus Companies:

1. City of Auburn Police and Fire Department
Address- Police Department, 1215 Lincoln Way, Auburn, CA 95603
Tel – 530-823-4237
Address – Fire Department, 1225 Lincoln Way, Room 7, Auburn, CA 95603
Tel- 530-823-4211, ext 2

2. City of Auburn Public Works Department
Address – 1225 Lincoln Way, Auburn CA 95603
Tel- 530-823-4211
3. Cal Fire
Address- 13760 Lincoln Way, Auburn, CA 95603
Tel- 530-823-4904
4. Auburn Union School District
Address- 255 Epperle Lane, Auburn, CA 95603
Tel- 530-885-7242
5. Placer Union School District
Address- 13000 New Airport Rd, Auburn, CA 95603
Tel- 530-886-4400
6. Placer County Transit
Address- 11432 F Avenue, Auburn, CA 95603 Tel- 530-885-2877

No excavation shall commence unless the CONTRACTOR has obtained the USA Inquiry Identification Number.

5-1.2 Accuracy of Utilities Information. The locations of known existing major utilities, whether above ground or underground, are indicated on the plans. Information and data reflected in the Contract Documents with respect to underground and above ground utilities at or contiguous to the site is based upon information and data furnished to the City and the Engineer by the owners of such utilities, and the City does not assume responsibility for the accuracy or completeness thereof. The CONTRACTOR shall take all possible precautions for the protection of unforeseen utility lines to provide for uninterrupted service and to provide such special protection as may be necessary.

The CONTRACTOR shall be responsible for determining the location and depth of all underground facilities, including service connections, which may affect or be affected by his/her operations and he/she shall include the cost to pothole all utilities within the limits of work in his/her bid. If an existing utility line, which has been marked by Underground Service Alert or is shown on the plans, is damaged by the CONTRACTOR, the CONTRACTOR shall repair the line and bear the cost thereof.

CONTRACTOR shall be aware that electrical conduits between street and traffic lights may exist beneath pavement and/or sidewalk in areas where such lights are in place and that said conduits are not shown on these plans.

In the event that the CONTRACTOR damages any existing utility lines that are not shown, shown incorrectly or the locations of which are not made known to the CONTRACTOR prior to excavation, a telephone call and written report shall be made immediately to the Utility owner, the Engineer, and to the City. If directed by the City, the CONTRACTOR shall make repairs under the provisions for changes and extra work contained in **SECTION 3 - CHANGES IN WORK** of these Standard Specifications.

5-2 PROTECTION.

Excavation, trenching, bedding and backfill construction shall be in accordance with the Contract Documents, applicable City requirements, the Standard Specifications, and the project drawings. All trenching including that for water, sewer, storm drain and utility conduits and all service connections and

meter boxes (not permitted in driveways) shall be completed and inspected and approved by the agency having jurisdiction, and the structural backfill inspected and tested for compaction and approved before aggregate base, paving, and other permanent surface construction may commence.

Bedding and backfill material shall be tested by the CONTRACTOR to establish a procedure and to control his operations. Compliance testing will be performed by the Soil Engineer.

The CONTRACTOR shall not interrupt the service function or disturb the support of any utility without authority from the owner or order from the AGENCY. All valves, switches, vaults, and meters shall be maintained readily accessible for emergency shutoff.

Where protection is required to ensure support of utilities located as shown on the Plans or in accordance with 5-1, the CONTRACTOR shall, unless otherwise provided, furnish and place the necessary protection at its expense.

Upon learning of the existence and location of any utility omitted from or shown incorrectly on the Plans, the CONTRACTOR shall immediately notify the Engineer in writing. When authorized by the Engineer, support or protection of the utility will be paid for as provided in 3-2.2.3 or 3-3.

The CONTRACTOR shall immediately notify the Engineer and the utility owner if any utility is disturbed or damaged. The CONTRACTOR shall bear the costs of repair or replacement of any utility damaged.

Where concrete is used for backfill or for structures which would result in embedment, or partial embedment, of a metallic utility installation; or where the coating, bedding or other cathodic protection system is exposed or damaged by the CONTRACTOR's operations, the CONTRACTOR shall notify the Engineer and arrange to secure the advice of the affected utility owner regarding the procedures required to maintain or restore the integrity of the system.

5-3 REMOVAL. Unless otherwise specified, the CONTRACTOR shall remove all interfering portions of utilities shown on the Plans or indicated in the Bid documents as "abandoned" or "to be abandoned in place". Before starting removal operations, the CONTRACTOR shall ascertain from the AGENCY whether the abandonment is complete, and the costs involved in the removal and disposal shall be included in the Bid for the items of work necessitating such removals.

5-4 RELOCATION. When feasible, the owners responsible for utilities within the area affected by the Work will complete their necessary installations, relocations, repairs, or replacements before commencement of work by the CONTRACTOR. When the Plans or Specifications indicate that a utility installation is to be relocated, altered, or constructed by others, the AGENCY will conduct all negotiations with the owners and work will be done at no cost to the CONTRACTOR, except as provided in 301-1.6. Utilities which are relocated in order to avoid interference shall be protected in their position and the cost of such protection shall be included in the Bid for the items of work necessitating such relocation.

After award of the Contract, portions of utilities which are found to interfere with the Work will be relocated, altered or reconstructed by the owners, or the Engineer may order changes in the Work to avoid interference. Such changes will be paid for in accordance with 3-2.

When the Plans or Specifications provide for the CONTRACTOR to alter, relocate, or reconstruct a utility, all costs for such work shall be included in the Bid for the items of work necessitating such work. Temporary or permanent relocation or alteration of utilities requested by the CONTRACTOR for its convenience shall be its responsibility and it shall make all arrangements and bear all costs.

The utility owner will relocate service connections as necessary within the limits of the Work or within temporary construction or slope easements. When not otherwise required by the plans and specifications and when directed by the Engineer, the CONTRACTOR shall arrange for the relocation of service connections as necessary between the meter and property line, or between the meter and limits of construction. The relocation of such service connections will be paid for in accordance with provisions of 3-3. Payment will include the restoration of all existing improvements which may be affected thereby. The

CONTRACTOR may agree with the owner of any utility to disconnect and reconnect interfering service connections. The AGENCY will not be involved in any such agreement.

5-5 DELAYS. The CONTRACTOR shall notify the Engineer of its construction schedule insofar as it affects the protection, removal, or relocation of utilities. Said notification shall be included as a part of the construction schedule required in 6-1. The CONTRACTOR shall notify the Engineer in writing of any subsequent changes in the construction schedule which will affect the time available for protection, removal, or relocation of utilities.

The CONTRACTOR will not be entitled to damages or additional payment for delays attributable to utility relocations or alterations if correctly located, noted, and completed in accordance with 5-1.

The CONTRACTOR may be given an extension of time for unforeseen delays attributable to unreasonably protracted interference by utilities in performing work correctly shown on the Plans.

The AGENCY will assume responsibility for the timely removal, relocation, or protection of existing main or trunkline utility facilities within the area affected by the Work if such utilities are not identified in Contract Documents. The CONTRACTOR will not be assessed liquidated damages for any delay caused by failure of AGENCY to provide for the timely removal, relocation, or protection of such existing facilities.

5-6 COOPERATION. When necessary, the CONTRACTOR shall so conduct its operations as to permit access to the Work site and provide time for utility work to be accomplished during the progress of the Work.

SECTION 6 – PROSECUTION, PROGRESS, AND ACCEPTANCE OF THE WORK

6-1 CONSTRUCTION SCHEDULE AND COMMENCEMENT OF WORK.

6-1.1 Pre-Construction Meeting and Submittal. A pre-construction meeting will be conducted by the City prior to commencement of construction at a time and place designated by the City. Those attending the meeting shall include, but not be limited to, the following:

- a. The CONTRACTORs representative(s)
- b. Sub-CONTRACTORs representative(s), if needed
- c. City of Auburn Director of Public Works
- d. City of Auburn Project Manager
- e. The Design Engineers
- f. The Construction Engineers
- g. The affected utility companies representatives
- h. City of Auburn Public Works Inspectors
- i. Caltrans' inspector and/or representative(s) if applicable

One week prior to this meeting the CONTRACTOR shall submit the following:

1. Construction Schedule
2. Traffic Control Plan
3. Emergency Contact List
4. List of Subcontractors

5. Storm Water Pollution Prevention Plan (SWPPP)

6-1.2 CONSTRUCTION SCHEDULE. After notification of award and prior to start of any work, the CONTRACTOR shall submit its proposed construction schedule to the Engineer for approval. The construction schedule shall be in the form of a tabulation, chart, or graph and shall be in sufficient detail to show chronological relationship of all activities of the project. These include, but are not limited to: estimated starting and completion dates of various activities, submittal of shop drawings to the Engineer for approval, procurement of materials and scheduling of equipment. The construction schedule shall recognize the requirements of 5-5 and reflect completion of all work under the Contract within the specified time and in accordance with the Specifications.

Unless otherwise provided, the Contract time shall commence upon the date of issuance of a notice to proceed. The Work shall start within 15 days thereafter, and be diligently prosecuted to completion within the time provided in the Specifications.

If the CONTRACTOR desires to make a major change in the method of operations after commencing construction, or if the schedule fails to reflect the actual progress, the CONTRACTOR shall submit to the Engineer a revised construction schedule in advance of beginning revised operations.

The Engineer may waive these requirements for work constructed under permit.

Prior to issuing the Notice to Proceed, the Engineer will schedule and conduct a pre-construction meeting with the CONTRACTOR to review the proposed construction schedule and delivery dates, arrange utility coordination, discuss construction methods, and clarify inspection procedures.

6-1.3 Emergency Contact List. The CONTRACTOR shall provide the following information in writing and submit it with the signed contract, contract bonds and certificates of insurance. Failure to comply may result in delays in the processing of the contract documents.

1. Name of authorized representative at the job site.
2. Address and telephone number where the above person can be reached 24 hours a day.
3. Address of the nearest office of the CONTRACTOR, if any, and the name and telephone number of a person at that office who is familiar with the project.
4. Address and telephone number of the CONTRACTOR's main office and the name and telephone number of the person at that office familiar with the project.

6-2 PROSECUTION OF WORK. To minimize public inconvenience and possible hazard and to restore street and other work areas to their original condition and state of usefulness as soon as practicable, the CONTRACTOR shall diligently prosecute the Work to completion. If the Engineer determines that the CONTRACTOR is failing to prosecute the Work to the proper extent, the CONTRACTOR shall, upon orders from the Engineer, immediately take steps to remedy the situation. All costs of prosecuting the Work as described herein shall be included in the CONTRACTOR's Bid. Should the CONTRACTOR fail to take the necessary steps to fully accomplish said purposes, after orders of the Engineer to do so, the AGENCY may suspend the work in whole or in part, until the CONTRACTOR takes said steps at no cost to the AGENCY.

As soon as possible under the provisions of the Specifications, the CONTRACTOR shall backfill all excavations and restore to usefulness all improvements existing prior to the start of the Work.

If Work is suspended through no fault of the AGENCY, all expenses and losses incurred by the CONTRACTOR during such suspensions shall be borne by the CONTRACTOR. If the CONTRACTOR fails to properly provide for public safety, traffic, and protection of the Work during periods of suspension, the AGENCY may elect to do so, and deduct the cost thereof from monies due the CONTRACTOR. Such actions will not relieve the CONTRACTOR from liability.

The CONTRACTOR shall submit monthly progress reports to the Engineer by the tenth day of each month. The report shall include an updated construction schedule. Any deviations from the original schedule shall be explained. Progress payments will be withheld pending receipt of any outstanding reports.

6-3 SUSPENSION OF WORK.

6-3.1 General. The Work may be suspended in whole or in part when determined by the Engineer that the suspension is necessary in the interest of the AGENCY. The CONTRACTOR shall comply immediately with any written order of the Engineer. Such suspension shall be without liability to the CONTRACTOR on the part of the AGENCY except as otherwise specified in 6-6.3.

6-3.2 Archaeological and Paleontological Discoveries. If discovery is made of items of archaeological or paleontological interest, the CONTRACTOR shall immediately cease excavation in the area of discovery and shall not continue until ordered by the Engineer. When resumed, excavation operations within the area of discovery shall be as directed by the Engineer.

Discoveries which may be encountered may include, but not be limited to, dwelling sites, stone implements or other artifacts, animal bones, human bones, and fossils.

The CONTRACTOR shall be entitled to an extension of time and compensation in accordance with the provisions of 6-6.

6-4 DEFAULT BY CONTRACTOR. If the CONTRACTOR fails to begin delivery of material and equipment, to commence the Work within the time specified, to maintain the rate of delivery of material, to execute the Work in the manner and at such locations as specified, or fails to maintain the Work schedule which will insure the AGENCY's interest, or, if the CONTRACTOR is not carrying out the intent of the Contract, the AGENCY may serve written notice upon the CONTRACTOR and the Surety on its Faithful Performance Bond demanding satisfactory compliance with the Contract.

The Contract may be canceled by the City Council without liability for damage, when in the City Council's opinion the CONTRACTOR is not complying in good faith, has become insolvent, or has assigned or subcontracted any part of the Work without the City Council's consent. In the event of such cancellation, the CONTRACTOR will be paid the actual amount due based on Contract Unit Prices or lump sums bid and the quantity of the Work completed at the time of cancellation, less damages caused to the AGENCY by acts of the CONTRACTOR. The CONTRACTOR, in having tendered a Bid, shall be deemed to have waived any and all claims for damages because of cancellation of Contract for any such reason. If the AGENCY declares the Contract canceled for any of the above reasons, written notice to that effect shall be served upon the Surety. The Surety shall, within 5 days, assume control and perform the Work as successor to the CONTRACTOR.

If the Surety assumes any part of the Work, it shall take the CONTRACTOR's place in all respects for that part, and shall be paid by the AGENCY for all work performed by it in accordance with the Contract. If the Surety assumes the entire Contract, all money due the CONTRACTOR at the time of its default shall be payable to the Surety as the Work progresses, subject to the terms of the Contract.

If the Surety does not assume control and perform the Work within 5 days after receiving a notice of cancellation, or fails to continue to comply, the AGENCY may exclude the Surety from the premises. The AGENCY may then take possession of all material and equipment and complete the Work by AGENCY forces, by letting the unfinished Work to another CONTRACTOR, or by a combination of such methods. In any event, the cost of completing the Work shall be charged against the CONTRACTOR and its Surety and may be deducted from any money due or becoming due from the AGENCY. If the sums due under the Contract are insufficient for completion, the CONTRACTOR or Surety shall pay to the AGENCY within 5 days after the completion, all costs in excess of the sums due.

The provisions of this subsection shall be in addition to all other rights and remedies available to the AGENCY under law.

6-5 TERMINATION OF THE CONTRACT. The City Council may terminate the Contract at its own discretion or when conditions encountered during the Work make it impossible or impracticable to proceed, or when the AGENCY is prevented from proceeding with the Contract by act of God, by law, or by official action of a public authority.

6-6 DELAYS AND EXTENSIONS OF TIME.

6-6.1 General. If delays are caused by unforeseen events beyond the control of the CONTRACTOR, such delays will entitle the CONTRACTOR to an extension of time as provided herein, but the CONTRACTOR will not be entitled to damages or additional payment due to such delays, except as provided in 6-6.3. Such unforeseen events may include: war, government regulations, labor disputes, strikes, fires, floods, adverse weather or elements necessitating cessation of work, inability to obtain materials, labor or equipment, required extra work, or other specific events as may be further described in the Specifications.

No extension of time will be granted for a delay caused by the CONTRACTOR's inability to obtain materials unless the CONTRACTOR furnishes to the Engineer documentary proof. The proof must be provided in a timely manner in accordance with the sequence of the CONTRACTOR's operations and the approved construction schedule.

If delays beyond the CONTRACTOR's control are caused by events other than those mentioned above, the Engineer may deem an extension of time to be in the best interests of the AGENCY. The CONTRACTOR will not be entitled to damages or additional payment due to such delays, except as provided in 6-6.3.

If delays beyond the CONTRACTOR's control are caused solely by action or inaction by the AGENCY, such delays will entitle the CONTRACTOR to an extension of time as provided in 6-6.2.

6-6.1.1 Notice of Delays. Whenever the CONTRACTOR foresees any delay in the prosecution of the work, and in any event immediately upon the occurrence of any delay which the CONTRACTOR regards as unavoidable, he/she shall notify the Engineer in writing of the probability of the occurrence of such delay and its cause so that the Engineer may take immediate steps to prevent, if possible, the occurrence or continuance of the delay, or, if prevention is not possible, may determine whether the delay is to be considered avoidable or unavoidable, how long it continues, and to what extent it will delay the prosecution and completion of the work. It will be concluded that any and all delays which have occurred in the prosecution and completion of the work have been avoidable delays, except such delays as shall have been called to the attention of the Engineer at the time of their occurrence and found by him/her to have been unavoidable. The CONTRACTOR shall make no claims for any delay not called to the attention of the Engineer at the time of its occurrence as an unavoidable delay.

6-6.1.2 Avoidable Delays. Avoidable delays in the prosecution or completion of the work shall include all delays which in the opinion of the Engineer would have been avoided by the exercise of care, prudence, foresight, and diligence on the part of the CONTRACTOR of his/her subcontractors. The following shall be considered avoidable delays within the meaning of the contract: 1) Delays in the prosecution of parts of the work which may in themselves be unavoidable but do not necessarily prevent or delay the prosecution of other parts of the work or the completion of the whole work within the time herein specified; 2) Reasonable loss of time resulting from the necessity of submitting samples of materials and drawings to the Engineer for approval and from performing tests of materials, measurements, and inspections; 3) Reasonable interference of other CONTRACTORS employed by the AGENCY and/or other CONTRACTORS working in the area which do not necessarily prevent the completion of the whole work within the time agreed upon; 4) Delays resulting from inaccurate or incomplete shop drawing submittals; and 5) Interference of other CONTRACTORS performing concurrent work.

6-6.1.3 Extension of Time. In case the work is not completed in the time specified, including such extensions of time as may have been granted for unavoidable delays, the CONTRACTOR will be assessed damages for delay in accordance with Paragraph 6-9.1. The AGENCY, however, shall have the right to grant an extension of time for avoidable delay if it is deemed in his/her best interest to do so. During such extension of time, the CONTRACTOR will be charged for engineering and inspection services and other costs as provided in Paragraph 6-6.2.1 but will not be assessed damages pursuant to Paragraph 6-9.

6-6.2 Extensions of Time. Extensions of time, when granted, will be based upon the effect of delays to the Work. They will not be granted for noncontrolling delays to minor portions of the Work unless it can be shown that such delays did or will delay the progress of the Work.

6-6.2.1 Compensation to AGENCY for Extension of Time. Compensation for extension of time for avoidable delay granted pursuant to Paragraph 6-6.1.3 shall be the actual cost to the AGENCY for engineering, inspection, general supervision, and overhead expenses which are directly chargeable to the work and which accrue during the period of such extension, except that the cost of final inspection and preparation of the final estimate shall not be included.

6-6.3 Payment for Delays to CONTRACTOR. The CONTRACTOR will be compensated for damages incurred due to delays for which the AGENCY is responsible. Such actual costs will be determined by the Engineer. The AGENCY will not be liable for damages which the CONTRACTOR could have avoided by any reasonable means, such as judicious handling of forces or equipment. The determination of what damages the CONTRACTOR could have avoided will be made by the Engineer.

Requests for an extension of time must be delivered to the AGENCY within ten (10) consecutive calendar days following the date of the occurrence that caused the delay. The request must be submitted in writing and must state the cause of the delay, the date of the occurrence causing the delay, and the amount of additional time requested. This shall be included as part of a revised construction schedule required in Section 6-1. Requests for extensions of time shall be supported by all evidence reasonably available or known to the CONTRACTOR, which would support the extension of time requested. Requests for extensions of time, which are not received within the time specified above, shall result in the forfeiture of the CONTRACTOR's right to receive any extension of time requested.

If the CONTRACTOR is requesting an extension of time because of weather, he/she shall supply daily written reports to the AGENCY's representative describing such weather, and the work that could not be performed that day because of such weather or conditions resulting therefrom and that he/she otherwise would have performed.

6-7 TIME OF COMPLETION

6-7.1 General. The CONTRACTOR shall complete the Work within the time set forth in the Contract. The CONTRACTOR shall complete each portion of the Work within such time as set forth in the Contract for such portion. Unless otherwise specified, the time of completion of the Contract shall be expressed in working days.

6-7.2 Working Day. A working day is any day within the period between the start of the Contract time as defined in 6-1 and the date provided for completion, or upon field acceptance by the Engineer for all work provided for in the Contract, whichever occurs first, other than:

1. Saturday,
2. Sunday,
3. any day designated as a holiday by the AGENCY,

4. any other day designated as a holiday in a Master Labor Agreement entered into by the CONTRACTOR or on behalf of the CONTRACTOR as an eligible member of a CONTRACTOR association,
5. any day the CONTRACTOR is prevented from working at the beginning of the workday for cause as defined in 6-6.1,
6. any day the CONTRACTOR is prevented from working during the first 5 hours with at least 60 percent of the normal work force for cause as defined in 6-6.1.

The CONTRACTOR's activities involving work which requires street closure, detours, and barricades shall be confined to the hours between 7:30 a.m. and 4:00 p.m. Monday through Friday. In addition, the CONTRACTOR shall not perform any Work on Saturday, Sunday, or on AGENCY-designated holidays. AGENCY-designated holidays are listed in **TABLE 1 – AGENCY-DESIGNATED HOLIDAYS** below. Deviation from these hours will be permitted upon approval of the Engineer, except in emergencies involving immediate hazard to persons or property.

Deviations from these hours will not be permitted without the prior consent of the Engineer, except in emergencies involving immediate hazard to persons or property. In the event of either a requested or emergency deviation, inspection service fees will be charged against the CONTRACTOR. Service fees will be calculated at overtime rates including benefits, overhead, and travel time; and will be deducted from the amounts due the CONTRACTOR.

Failure of the CONTRACTOR to adhere to working day requirements will result in damages being sustained by the City. Such damages are, and will continue to be, impracticable and extremely difficult to determine. For each OCCURRENCE of a working day or hours violation, as provided herein, the CONTRACTOR shall pay to the AGENCY, or have withheld from monies due to it, the sum of \$1,000.00.

TABLE 1 – AGENCY-DESIGNATED HOLIDAYS

New Year's Day

Martin Luther King, Jr. Day

Lincoln's Birthday

President's Day

Memorial Day

Independence Day

Labor Day

Veteran's Day

Thanksgiving Day

Day after Thanksgiving

Christmas Eve

Christmas Day

New Year's Eve

EXECUTION OF THE CONTRACT SHALL CONSTITUTE AGREEMENT BY THE AGENCY AND CONTRACTOR THAT \$1,000 PER VIOLATION IS THE MINIMUM VALUE OF THE COST AND ACTUAL DAMAGED CAUSED BY FAILURE OF THE CONTRACTOR TO LIMIT PERFORMANCE OF THE WORK BETWEEN THE ALLOTTED TIMES, THAT SUCH SUM SHALL NOT BE

CONSTRUED AS A PENALTY, AND THAT SUCH SUM MAY BE DEDUCTED FROM PAYMENTS DUE THE CONTRACTOR IF SUCH DELAY OCCURS.

6-7.3 Contract Time Accounting. The Engineer will make a daily determination of each working day to be charged against the Contract time. These determinations will be discussed and the CONTRACTOR will be furnished a periodic statement showing allowable number of working days of Contract time, as adjusted, at the beginning of the reporting period. The statement will also indicate the number of working days charged during the reporting period and the number of working days of Contract time remaining. If the CONTRACTOR does not agree with the statement, it shall file a written protest within 15 days after receipt, setting forth the facts of the protest. Otherwise, the statement will be deemed to have been accepted.

6-8 COMPLETION, ACCEPTANCE, AND WARRANTY. The Work will be inspected by the Engineer for acceptance upon receipt of the CONTRACTOR's written assertion that the Work has been completed.

If, in the Engineer's judgment, the Work has been completed and is ready for acceptance, it will so certify to the City Council, which may accept the completed Work. The Engineer will, in its certification to the City Council, give the date when the Work was completed. This will be the date when the CONTRACTOR is relieved from responsibility to protect the Work.

All work shall be warranted by the CONTRACTOR against defective workmanship and materials for a period of 1 year from the date the Work was completed. The CONTRACTOR shall replace or repair any such defective work in a manner satisfactory to the Engineer, after notice to do so from the Engineer, and within the time specified in the notice. If the CONTRACTOR fails to make such replacement or repairs within the time specified in the notice, the AGENCY may perform this work and the CONTRACTOR's sureties shall be liable for the cost thereof.

6-8.1 General Guaranty. The CONTRACTOR shall remedy any defects in the Work and pay for any damage to other work resulting therefrom, which shall appear within a period of one year from the date of final acceptance of the Work unless a longer period is specified. The AGENCY will give notice of observed defects with reasonable promptness.

6-9 FORFEITURE DUE TO DELAY. The CONTRACTOR shall complete all or any designated portion of the Work called for under the Contract within the time set forth in Section C (Proposal) of these Specifications.

In accordance with Government Code 53069.85, and all other applicable law, the CONTRACTOR agrees to forfeit and pay the AGENCY the amount of Five Hundred Dollars (\$500.00) per day for each and every day of unauthorized delay beyond the completion date, which shall be deducted from any monies due the CONTRACTOR. This payment shall be considered liquidated damages. CONTRACTOR agrees that such liquidated damages are reasonable under the circumstances existing at the time of execution of the contract, that such liquidated damages are to compensate AGENCY for losses that are difficult to measure and that such damages are not a penalty.

Failure of the CONTRACTOR to perform any covenant or condition contained in the Contract Documents within the time period specified shall constitute a material breach of this Contract entitling the AGENCY to terminate the Contract unless the CONTRACTOR applies for, and receives, an extension of time in accordance with the procedures set forth in Section 5-5.

Failure of the AGENCY to insist upon the performance of any covenant or conditions within the time period specified in the Contract Documents shall not constitute a waiver of the CONTRACTOR's duty to complete performance within the designated periods unless the AGENCY has executed a waiver in writing.

The AGENCY's agreement to waive a specific time provision or to extend the time for performance shall not constitute a waiver of any other time provision contained in the Contract Documents.

Failure of the CONTRACTOR to complete performance promptly within the additional time authorized in a waiver or extension of time agreement shall constitute a material breach of this Contract entitling the AGENCY to terminate this agreement.

The CONTRACTOR shall not be deemed in breach of this Contract and no forfeiture due to delay shall be made because of any delays in the completion of the Work due to unforeseeable causes beyond the control and without the fault or negligence of the CONTRACTOR provided the CONTRACTOR requests an extension of time in accordance with the procedures set forth in Section 5-5. Unforeseeable causes of delay beyond the control of the CONTRACTOR shall include acts of God, acts of a public enemy, acts of the government, acts of the AGENCY, or acts of another CONTRACTOR in the performance of a contract with the AGENCY, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and weather, or delays of subcontractors due to such causes, or delays caused by failure of the owner of a utility to provide for removal or relocation of existing utility facilities. Delays caused by actions or neglect of CONTRACTOR or his/her agents, servants, employees, officers, subcontractors, directors, or of any party contracting to perform part of all of the Work or to supply any equipment or materials shall not be excusable delays. Excusable delays (those beyond the CONTRACTOR's control) shall not entitle the CONTRACTOR to any additional compensation. The sole recourse of the CONTRACTOR shall be to seek an extension of time.

6-10 USE OF IMPROVEMENT DURING CONSTRUCTION. The AGENCY reserves the right to take over and utilize all or part of any completed facility or appurtenance. The CONTRACTOR will be notified in writing in advance of such action. Such action by the AGENCY will relieve the CONTRACTOR of responsibility for injury or damage to said completed portions of the improvement resulting from use by public traffic or from the action of the elements or from any other cause, except CONTRACTOR operations or negligence. The CONTRACTOR will not be required to reclean such portions of the improvement before field acceptance, except for cleanup made necessary by its operations. Nothing in this section shall be construed as relieving the CONTRACTOR from full responsibility for correcting defective work or materials.

In the event the AGENCY exercises its right to place into service and utilize all or part of any completed facility or appurtenance, the AGENCY will assume the responsibility and liability for injury to persons or property resulting from the utilization of the facility or appurtenance so placed into service, except for any such injury to persons or property caused by any willful or negligent act or omission by the CONTRACTOR, Subcontractor, their officers, employees, or agents.

6-11 GUARANTEE. The CONTRACTOR shall warrant and guarantee the entire Work and all parts thereof, including that performed and constructed by subcontractors, and others employed directly or indirectly on the Work, against faulty or defective materials, equipment or workmanship for the maximum period provided by law. In addition thereto, for a period of one (1) year commencing on the date of acceptance of the Work, the CONTRACTOR shall, upon the receipt of notice in writing from the AGENCY, promptly make all repairs arising out of defective materials, workmanship or equipment and bear the cost thereof. The AGENCY is hereby authorized to make such repairs and the CONTRACTOR and Surety shall bear the cost thereof if, ten (10) days after the giving of such notice to the CONTRACTOR, the CONTRACTOR has failed to make or undertake with due diligence the repairs; provided, however, that, in the case of an emergency where, in the opinion of the AGENCY, delay could cause serious loss or damage, repairs may be made without notice being sent to the CONTRACTOR or Surety, and all expense in connection therewith shall be charged to the CONTRACTOR and Surety.

For the purpose of this article "Acceptance of the Work" shall mean the acceptance of the Work by the AGENCY in accordance with Subsection 6-8 but not for the purpose of extinguishing any covenant or agreement or agreement on the part of the CONTRACTOR to be performed or fulfilled under this Contract, which has not in fact been performed or fulfilled at the time of such acceptance all of such covenants and agreements, shall continue to be binding on the CONTRACTOR until they have been fulfilled.

The effective date of Acceptance of the Work and commencement of the Guarantee shall be the date of acceptance of the Notice of Completion by the City Council.

6-12 DISPUTES AND CLAIMS

6-12.1 General. Any and all decisions made on appeal pursuant to this Subsection 6-12 shall be in writing. Any “decision” purportedly made pursuant to this Subsection 6-12 that is not in writing shall not be binding upon the AGENCY and should not be relied upon by the CONTRACTOR.

Nothing in this subsection shall be considered as relieving the CONTRACTOR from his/her duty to file the notice required under Subsection 6-13 or other duties required by the Contract Documents.

6-12.2 Administrative Review. Request for review made to the Construction Inspector or Project Engineer may be either oral or written. Request for review made to the City Engineer shall be made in writing with supporting evidence attached.

The CONTRACTOR shall submit each request for review within twenty-one (21) calendar days of receipt of the decision that he/she is requesting.

Prior to demand for arbitration, the CONTRACTOR shall exhaust his/her administrative remedies by attempting to resolve his/her dispute or claim with AGENCY’s staff in the following sequence:

1. Project Engineer
2. City Engineer

Should the Project Engineer fail to address the CONTRACTOR’s request for review of a disputed decision within fourteen (14) calendar days after receiving such request, the CONTRACTOR may proceed directly to the City Engineer. At the option of the AGENCY, the person to whom the request for review is directed may elect to take such request to a higher level and the CONTRACTOR’s request shall be deemed to be properly submitted to such higher level.

The City Engineer shall address disputes or claims within twenty eight (28) calendar days after receiving such request and all necessary supporting data. The City Engineer’s decision on the dispute or claim shall be the AGENCY’s final decision.

6-12.3 Arbitration. Claims and disputes arising under or related to the performance of the contract, except for claims that have been released by execution of the “Release on Contract” as provided in Subsection 9-4, shall be resolved in arbitration unless the AGENCY and the CONTRACTOR agree in writing, after the claim or dispute has arisen, to waive arbitration and to have the claim or dispute litigated in court of competent jurisdiction. Arbitration shall be conducted, to the extent feasible, pursuant to Chapter 3 (Sections 301-393, inclusive) of Division 2 of Title 1 of the California Code of Regulations except that references therein to the “State Contract Act” shall be construed to mean “applicable law” and “Public Agency”, or “Department” shall be construed to mean “AGENCY” as defined in Subsection 1.2. The arbitration decision shall be decided under and in accordance with California law, supported by substantial evidence, and in writing, contain the basis for the decision, findings of fact, and conclusions of law.

Arbitration shall be initiated by a Demand for Arbitration. The CONTRACTOR shall request a Demand for Arbitration not later than ninety (90) calendar days after the date of the final written decision of the AGENCY on the claim or dispute.

All contracts valued at more than \$15,000 between the CONTRACTOR and his/her Subcontractors and Suppliers shall include a provision that the Subcontractors and Suppliers shall be bound to the CONTRACTOR to the same extent that the CONTRACTOR is bound to the AGENCY by all terms and provisions of the Contract, including these arbitration provisions.

6-13 NOTICE OF POTENTIAL CLAIM. The CONTRACTOR shall not be entitled to the payment of any additional compensation for any cause, including any act, or failure to act, by the Engineer, or the happening of any event, thing or occurrence, unless the CONTRACTOR shall have given the Engineer due notice in writing, of the potential claim as hereinafter specified, provided, however, that compliance with this Subsection 6-12 shall not be a prerequisite as to any claim that is based on differences in measurements or errors of computation as to the Contract quantities.

Additionally, this Subsection 6-13 shall not supersede the specific notice and protest requirements of Subsection 3-4 “Changed Conditions” and Subsection 6-7.3 “Contract Time Accounting” respectively.

A written notice of potential claim shall set forth the reasons the CONTRACTOR believes additional compensation will or may be due, the nature of the costs involved, and, insofar as possible, the amount of the potential claim. A notice as above required must have been given to the Engineer prior to the time that the CONTRACTOR shall have performed the Work giving rise to the potential claim for additional compensation, if based on an act or failure to act by the Engineer, or in all other cases within fifteen (15) days after the happening of the event, thing or occurrence giving rise to the potential claim.

It is the intention of this Subsection 6-13 that differences between the parties arising under and by the virtue of the Contract be brought to the attention of the Engineer at the earliest possible time in order that such matters may be settled, if possible, or other appropriate action promptly taken. The CONTRACTOR hereby agrees that he/she shall have no right to additional compensation for any claim that may be based on any such act, failure to act, event, thing or occurrence for which no written notice of potential claim as herein required was filed.

SECTION 7 – RESPONSIBILITIES OF THE CONTRACTOR

7-1 CONTRACTOR’S EQUIPMENT AND FACILITIES. The CONTRACTOR shall furnish and maintain in good condition all equipment and facilities as required for the proper execution and inspection of the Work. Such equipment and facilities shall meet all requirements of applicable ordinances and laws.

A noise level limit of 85 dba at a distance of fifty (50) feet shall apply to all construction equipment on or related to the job, whether owned by the CONTRACTOR or not. The use of excessively loud warning signals shall be avoided except in those cases where required for the protection of personnel.

The CONTRACTOR shall arrange and maintain a secure storage site for all equipment and materials. All equipment and unused materials shall be returned to this site at the end of each work day.

7-2 LABOR.

7-2.1 General. Only competent workers shall be employed on the Work. Any person employed who is found to be incompetent, intemperate, troublesome, disorderly, or otherwise objectionable, or who fails or refuses to perform work properly and acceptably, shall be immediately removed from the Work by the CONTRACTOR and not be reemployed on the Work.

7-2.2 Laws. The CONTRACTOR, its agents and employees shall be bound by and comply with applicable provisions of the Labor Code and Federal, State and local laws related to labor.

The CONTRACTOR shall strictly adhere to the provisions of the Labor Code regarding minimum wages; the 8-hour day and 40-hour week; overtime; Saturday, Sunday, and holiday work; and nondiscrimination because of race, color, national origin, sex, or religion. Failure to file any report due under said orders will result in suspension of periodic progress payments.

In accordance with the Labor Code, the City Council has on file and will publish a schedule of prevailing wage rates for the types of work to be done under the Contract. The CONTRACTOR shall not pay less than these rates.

Each worker shall be paid subsistence and travel as required by the collective bargaining agreements on file with the State of California Department of Industrial Relations.

The CONTRACTOR's attention is directed to Section 1776 of the Labor Code which imposes responsibility upon the CONTRACTOR for the maintenance, certification, and availability for inspection of such records for all persons employed by the CONTRACTOR or Subcontractor in connection with the project. The CONTRACTOR shall agree through the Contract to comply with this Section and the remaining provisions of the Labor Code.

The CONTRACTOR shall ensure unlimited access to the job site for all Equal Opportunity Compliance officers.

Every CONTRACTOR and Subcontractor shall keep an accurate record showing the name, occupation, and the actual per diem wages paid to each worker employed by him/her in connection with the public work. The record shall be kept open at all reasonable hours to the inspection of the body awarding the Contract and to the Division of Labor Law Enforcement.

7-2.2.1 Overtime and Shift Work. The CONTRACTOR may establish overtime and shift work as a regular procedure only with the written permission of the Engineer. Such permission may be revoked at any time. No work other than overtime and shift work established as a regular procedure shall be done outside the hours described in Section 6-7.2, nor on Saturdays, Sundays or legal holidays, except such work as is necessary for the proper care and protection of the work already performed or except in case of an emergency.

All costs for overtime inspection, except those occurring as a result of overtime and shift work established as a regular procedure, shall be paid by the CONTRACTOR. Overtime inspection shall include inspection required during holidays observed by the AGC and Trade Unions, Saturdays, Sundays, and any weekday outside the hours described in Section 6-7.2. Such costs will include but will not necessarily be limited to engineering, inspection, general supervision and other overhead expenses that are directly chargeable to the overtime work. The AGENCY shall deduct all such charges from payments due the CONTRACTOR.

7-3 LIABILITY INSURANCE.

7-3.1 General. CONTRACTOR and AGENCY agree that AGENCY, its employees, agents and officials should, to the extent permitted by law, be fully protected from any loss, injury, damage, claim, lawsuit, cost, expense, attorneys fees, litigation costs, defense costs, court costs or any other cost arising out of or in any way related to the performance of this Agreement. Accordingly, the provisions of this indemnity provision are intended by the parties to be interpreted and construed to provide the fullest protection possible under the law to the AGENCY. CONTRACTOR acknowledges that AGENCY would not have entered into this Agreement in the absence of the commitment of CONTRACTOR to indemnify and protect AGENCY as set forth here.

7-3.2 To the full extent permitted by law, CONTRACTOR shall defend, indemnify and hold harmless AGENCY, its employees, agents and officials, from any liability, claims, suits, actions, arbitration proceedings, administrative proceedings, regulatory proceedings, losses, expenses or costs of any kind, whether actual, alleged, or threatened, actual attorneys fees incurred by AGENCY, court costs, interest, defense costs including expert witness fees and any other costs or expenses of any kind whatsoever without restriction or limitation incurred in relation to, as a consequence of, arising out of or in any way attributable actually, allegedly or impliedly, in whole or in part to the performance of this Agreement. All obligations under this provision are to be paid by CONTRACTOR as they are incurred by the AGENCY.

7-3.3 Without affecting the rights of AGENCY under any provision of this agreement or this section, CONTRACTOR shall not be required to indemnify and hold harmless AGENCY as set forth above for liability attributable to the sole fault of AGENCY, provided such sole fault is determined by agreement between the parties or the findings of a court of competent jurisdiction.

This exception will apply only in instances where the AGENCY is shown to have been solely at fault and not in instances where CONTRACTOR is solely or partially at fault or in instances where AGENCY's fault accounts for only a percentage of the liability involved. In those instances, the obligation of CONTRACTOR will be all-inclusive and AGENCY will be indemnified for all liability incurred, even though a percentage of the liability is attributable to the conduct of the AGENCY.

7-3.4 CONTRACTOR acknowledges that its obligation pursuant to this section extends to liability attributable to AGENCY, if that liability is less than the sole fault of AGENCY. CONTRACTOR has no obligation under this Agreement for liability proven in a court of competent jurisdiction or by written agreement between the parties to be the sole fault of AGENCY.

7-3.5 The obligations of CONTRACTOR under this or any other provision of this Agreement will not be limited by the provisions of any workers compensation act or similar act. CONTRACTOR expressly waives its statutory immunity under such statutes or laws as to AGENCY, its employees, agents and officials.

7-3.6 CONTRACTOR agrees to obtain executed indemnity agreements with provisions identical to those as set forth here in this section from each and every subcontractor, sub-tier CONTRACTOR or any other person or entity involved by, for, with or on behalf of CONTRACTOR in the performance or subject matter of this Agreement. In the event CONTRACTOR fails to obtain such indemnity obligations from others as required here, CONTRACTOR agrees to be fully responsible according to the terms of this section.

7-3.7 Failure of AGENCY to monitor compliance with these requirements imposes no additional obligations on AGENCY and will in no way act as a waiver of any rights hereunder. This obligation to indemnify and defend AGENCY as set forth herein is binding on the successors, assigns or heirs of CONTRACTOR and shall survive the termination of this Agreement or this section.

7-3.8 CONTRACTOR agrees to provide insurance in accordance with the requirements as set forth here. If CONTRACTOR uses existing coverage to comply with these requirements and that coverage does not meet the requirements set forth herein, CONTRACTOR agrees to amend, supplement or endorse the existing coverage to do so. The following coverages will be provided by CONTRACTOR and maintained on behalf of AGENCY and in accordance with the requirements set forth herein.

7-3.9 Commercial General Liability/Umbrella Insurance. Primary insurance shall be provided on ISO-CGL form No. CG 00 01 11 85 or 88. Total limits shall be not less than two million dollars (\$2,000,000.00) per occurrence for all coverages and two million dollars (\$2,000,000.00) general aggregate. AGENCY and its officers, agents and employees shall be named as additional insureds using ISO additional insureds endorsement form CG 20 10 11 85 (in no event will AGENCY accept an endorsement form with an edition date later than 1990). Coverage shall apply on a primary non-contributing basis in relation to any other insurance or self-insurance, primary or excess, available to AGENCY or any employee or agent of AGENCY. Coverage shall not be limited to the vicarious liability or supervisory role of any additional insured. Umbrella Liability Insurance (over primary) shall apply to bodily injury/property damage, personal injury/advertising injury, at a minimum, and shall include a "drop down" provision providing primary coverage above a maximum of \$25,000.00 self-insured retention for liability not covered by primary policies but covered by the umbrella policy. Coverage shall be following form to any underlying coverage. Coverage shall be provided on a "pay on behalf" basis, with defense costs payable in addition to policy limits. There shall be no cross-liability exclusion. Policies shall have concurrent starting and ending dates.

Each policy of insurance shall contain a clause prohibiting cancellation, modification or lapse without thirty (30) days prior written notice having been given to the City. All insurance policies shall be subject to approval by the City Attorney and certificates evidencing such policies shall be provided to the City concurrently with the filing of all required bonds.

7-3.10 Business Auto/Umbrella Liability Insurance. Primary coverage shall be written on ISO Business Auto Coverage form CA 00 01 06 92 including symbol 1 (Any Auto). Limits shall be no less than two million dollars (\$2,000,000.00) per accident. Starting and ending dates shall be concurrent. If CONTRACTOR owns no autos, a non-owned auto endorsement to the General Liability policy drafted above is acceptable.

7-4 WORKERS' COMPENSATION INSURANCE.

7-4.1 Workers' Compensation/Employers' Liability shall be written on a policy form providing workers' compensation statutory benefits as required by law. Employers' liability limits shall be no less than one million dollars per accident or disease. Employers' liability coverage shall be scheduled under any umbrella policy described above. Unless otherwise agreed, this policy shall be endorsed to waive any right of subrogation as respects the AGENCY, its officers, agents or employees.

7-4.2 CONTRACTOR and AGENCY further agree as follows:

7-4.2.1 This Section supersedes all other sections and provisions of this Agreement to the extent that any other section or provision conflicts with or impairs the provisions of this Section.

7-4.2.2 Nothing contained in this Section is to be construed as affecting or altering the legal status of the parties to this Agreement. The insurance requirements set forth in this Section are intended to be separate and distinct from any other provision in this Agreement and shall be interpreted as such.

7-4.2.3 All insurance coverage and limits provided pursuant to this Agreement shall apply to the full extent of the policies involved, available, or applicable. Nothing contained in this Agreement or any other agreement relating to the AGENCY or its operations limits the application of each insurance coverage.

7-4.2.4 Requirements of specific coverage features or limits contained in this Section are not intended as a limitation on coverage, limits or other requirements, or a waiver of any coverage normally provided by any insurance. Specific reference to a given coverage feature is for purposes of clarification only and is not intended by any party to be all-inclusive, or to the exclusion of other coverage, or a waiver of any type.

7-4.2.5 For purposes of insurance coverage only, this Agreement shall be deemed to have been executed immediately upon any party hereto taking any steps that can be deemed to be in furtherance of or towards performance of this Agreement.

7-4.2.6 All general or auto liability insurance coverage provided pursuant to this Agreement, or any other agreements pertaining to the performance of this Agreement, shall not prohibit CONTRACTOR, and CONTRACTOR's agents, officers or employees from waiving the right of subrogation prior to a loss. CONTRACTOR hereby waives all rights of subrogation against AGENCY.

7-4.2.7 Unless otherwise approved by AGENCY, CONTRACTOR's insurance shall be written by insurers authorized to do business in the State of California and with a minimum "Best's" Insurance Guide rating of "A:VII." Self-insurance will not be considered to comply with these insurance specifications.

7-4.2.8 In the event any policy of insurance required by this Agreement does not comply with these requirements or is canceled and not replaced, AGENCY has the right but not the duty to obtain the insurance it deems necessary and any premium paid by AGENCY will be promptly reimbursed by CONTRACTOR. Upon CONTRACTOR's failure to make such reimbursement within 30 days of written demand, AGENCY may deduct that sum from any monies due CONTRACTOR hereunder or otherwise.

7-4.2.9 CONTRACTOR agrees to provide evidence of the insurance required herein, satisfactory to AGENCY, consisting of certificate(s) of insurance evidencing all of the coverages required and an additional insured endorsement to CONTRACTOR's general liability and umbrella liability policy (if any) using ISO form CG 20 10 11 85. Certificate(s) are to reflect that the insurer will provide 30 days' notice of any cancellation of coverage. CONTRACTOR agrees to require its insurer to modify such certificates to delete any exculpatory wording stating that failure of insurer to mail written notice of cancellation imposes no obligation, and to delete the word "endeavor" with regard to any notice provisions. CONTRACTOR agrees to provide complete copies of policies to AGENCY upon request.

7-4.2.10 CONTRACTOR shall provide proof that policies of insurance required herein expiring during the term of this Agreement have been renewed or replaced with other policies providing at least the same coverage. Such proof shall be furnished within 72 hours of the expiration of the coverages.

7-4.2.11 Any actual or alleged failure on the part of AGENCY or any other additional insured under these requirements to obtain proof of insurance required under this Agreement in no way waives any right or remedy of AGENCY or any additional insured, in this or any other regard.

7-4.2.12 CONTRACTOR agrees to require all subcontractors or other parties hired for this project to provide general liability insurance naming as additional insureds all parties to this Agreement. CONTRACTOR agrees to obtain certificates evidencing such coverage and make reasonable efforts to ensure that such coverage is provided as required here. CONTRACTOR agrees to require that no contract used by any subcontractor, or contracts CONTRACTOR enters into on behalf of AGENCY, will reserve the right to charge back to AGENCY the cost of insurance required by this Agreement. CONTRACTOR agrees that upon request, all agreements with subcontractors or others with whom CONTRACTOR contracts on behalf of AGENCY will be submitted to AGENCY for review. Failure of AGENCY to request copies of such agreement will not impose any liability on AGENCY, its officers, agents, or employees.

7-4.2.13 If CONTRACTOR is a Limited Liability Company, general liability coverage must be amended so that the Limited Liability Company and its Managers, Affiliates, employees, agents and other persons necessary or incidental to its operations are insureds.

7-4.2.14 CONTRACTOR agrees to provide immediate notice to AGENCY of any claim or loss against CONTRACTOR that includes AGENCY as a defendant. AGENCY assumes no obligation or liability by such notice, but has the right (but not the duty) to monitor the handling of any such claim or claims.

7-5 PERMITS. Prior to the start of any work, the CONTRACTOR shall apply for and receive any applicable City, County, State, and Federal permits.

The CONTRACTOR shall pay all business taxes or license fees that are required for the work.

All costs associated with these permits are responsibility of CONTRACTOR. If applicable, CONTRACTOR is required to obtain a no fee City Encroachment permit for this project and comply with all permit conditions.

7-6 THE CONTRACTOR'S REPRESENTATIVE. Before starting work, the CONTRACTOR shall designate in writing a representative who shall have complete authority to act for it. An alternative representative may be designated as well. The representative or alternate shall be present at the Work site whenever work is in progress or whenever actions of the elements necessitate its presence to take measures necessary to protect the Work, persons, or property. Any order or communication given to this representative shall be deemed delivered to the CONTRACTOR. A joint venture shall designate only one representative and alternate. In the absence of the CONTRACTOR or its representative, instructions or

directions may be given by the Engineer to the superintendent or person in charge of the specific work to which the order applies. Such order shall be complied with promptly and referred to the CONTRACTOR or its representative.

In order to communicate with the AGENCY, the CONTRACTOR's representative, superintendent, or person in charge of specific work shall be able to speak, read, and write the English language.

7-7 COOPERATION AND COLLATERAL WORK. The CONTRACTOR shall be responsible for ascertaining the nature and extent of any simultaneous, collateral, and essential work by others. The AGENCY, its workers and CONTRACTORS and others, shall have the right to operate within or adjacent to the Work site during the performance of such work.

The AGENCY, the CONTRACTOR, and each of such workers, CONTRACTORS and others, shall coordinate their operations and cooperate to minimize interference.

The CONTRACTOR shall include in its Bid all costs involved as a result of coordinating its work with others. The CONTRACTOR will not be entitled to additional compensation from the AGENCY for damages resulting from such simultaneous, collateral, and essential work. If necessary to avoid or minimize such damage or delay, the CONTRACTOR shall redeploy its work force to other parts of the Work.

Should the CONTRACTOR be delayed by the AGENCY, and such delay could not have been reasonably foreseen or prevented by the CONTRACTOR, the Engineer will determine the extent of the delay, the effect on this project, and any extension of time.

CONTRACTOR shall coordinate his/her work so as to minimize disruption to ongoing or scheduled private development projects in the project area.

7-8 PROJECT SITE MAINTENANCE.

7-8.1 Cleanup and Dust Control. Throughout all phases of construction, including suspension of work, and until the final acceptance, the CONTRACTOR shall keep the site clean and free from rubbish and debris. The CONTRACTOR shall also abate dust nuisance by cleaning, sweeping and sprinkling with water, or other means as necessary. The use of water resulting in mud on public streets will not be permitted as a substitute for sweeping or other methods.

When required by the Plans or Specifications, the CONTRACTOR shall furnish and operate a self-loading motor sweeper with spray nozzles at least once each working day for the purpose of keeping paved areas acceptably clean wherever construction, including restoration, is incomplete.

Materials and equipment shall be removed from the site as soon as they are no longer necessary. Before the final inspection, the site shall be cleared of equipment, unused materials, and rubbish so as to present a satisfactory clean and neat appearance. All cleanup costs shall be included in the CONTRACTOR's Bid.

Care shall be taken to prevent spillage on haul routes. Any such spillage shall be removed immediately and the area cleaned.

Excess excavated material from catch basins or similar structures shall be removed from the site immediately. Sufficient material may remain for use as backfill if permitted by the Specifications. Forms and form lumber shall be removed from the site as soon as practicable after stripping.

Failure of the CONTRACTOR to comply with the Engineer's cleanup orders may result in an order to suspend work until the condition is corrected. No additional compensation will be allowed as a result of such suspension.

7-8.1.2 Work Area Appearance

The CONTRACTOR shall maintain a neat appearance to the Work at all times.

All unsuitable construction materials and rubbish and debris shall be regularly removed from the job site, be transported to a suitable location, and be disposed of in a proper and legal manner. Materials which are to be disposed of shall not be stored at the project sites but shall be removed before the end of the each working day.

In any area visible to the public, the following shall apply:

1. Broken concrete and debris developed during clearing and grubbing shall be disposed of weekly.
2. The CONTRACTOR shall furnish trash bins for all debris from structure construction. All debris shall be placed in trash bins daily.
3. Forms or false work that are to be re-used shall be neatly stacked concurrent with their removal.
4. Forms and false work that are not to be re-used shall be disposed of with their removal.
5. Wash down from concrete trucks shall be at one location. Concrete from wash down procedures shall be removed from the site weekly.

7-8.2 Air Pollution Control. The CONTRACTOR shall not discharge smoke, dust, or any other air contaminants into the atmosphere in such quantity as will violate the regulations of any legally constituted authority.

7-8.3 Vermin Control. At the time of acceptance, structures entirely constructed under the Contract shall be free of rodents, insects, vermin, and pests. Necessary extermination work shall be arranged and paid for by the CONTRACTOR as part of the Work within the Contract time, and shall be performed by a licensed exterminator in accordance with requirements of governing authorities. The CONTRACTOR shall be liable for injury to persons or property and responsible for the elimination of offensive odors resulting from extermination operations.

7-8.4 Sanitation. The CONTRACTOR shall provide and maintain enclosed toilets for the use of employees engaged in the Work. These accommodations shall be maintained in a neat and sanitary condition. They shall also comply with all applicable laws, ordinances, and regulations pertaining to public health and sanitation of dwellings and camps.

Wastewater shall not be interrupted. Should the CONTRACTOR disrupt existing sewer facilities, sewage shall be conveyed in closed conduits and disposed of in a sanitary sewer system. Sewage shall not be permitted to flow in trenches or be covered by backfill.

7-8.5 Temporary Light, Power, and Water. The CONTRACTOR shall furnish, install, maintain, and remove all temporary light, power, and water at its own expense. These include piping, wiring, lamps, and other equipment necessary for the Work. The CONTRACTOR shall not draw water from any fire hydrant (except to extinguish a fire), without obtaining permission from the water agency concerned.

7-8.6 Water Pollution Control. The CONTRACTOR shall exercise every reasonable precaution to protect channels, storm drains, and bodies of water from pollution. It shall conduct and schedule operations so as to minimize or avoid muddying and silting of said channels, drains, and waters. Water pollution control work shall consist of constructing those facilities which may be required to provide prevention, control, and abatement of water pollution.

7-8.6.1 General. This item shall consist of preparation, implementation and compliance with a storm water pollution prevention plan (SWPPP) for the project, if applicable.

7-8.6.2 Storm Water Pollution Prevention Plan (SWPPP) Preparation. CONTRACTOR shall submit to the engineer a completed and signed SWPPP at the preconstruction conference. The plan may utilize the practices recommended in the latest edition of the *California Storm Water Best Management Practices Handbook*, available from California Stormwater Quality Association (CSQA), and online at <http://www.cabmphandbooks.net/>. The plan shall be consistent with the construction General Permit, issued by the State Water Resources, Control City Council, through submittal of the Notice of Intent (NOI).

If construction will occur between October 15 and April 15 (considered as the rainy season per City Ordinance), a wet weather erosion control plan must be submitted. Additionally, Best Management Practices (BMPs) implemented during the AGENCY's rainy season shall include but not be limited to those appropriate for wet weather conditions.

7-8.6.3 Storm Water Pollution Prevention Measures. All storm water pollution prevention measures shall be in accordance with the submitted SWPPP. In the event circumstances during the course of construction require changes to the original SWPPP, a revised plan shall be promptly submitted to the AGENCY's representative in each instance. No responsibility shall accrue to the AGENCY as a result of the plan or as a result of knowledge of the plan. All work installed by the CONTRACTOR in connection with the SWPPP but not specified to become a permanent part of the project shall be removed and the site restored in so far as practical to its original condition prior to completion of construction or when directed by the AGENCY's representative.

7-8.6.4 Storm Water Pollution Prevention – Measurement And Payment. Unless otherwise indicated in the Special Provisions, measurement and payment for Storm Water Pollution Prevention Measures, as described herein, shall be included in the items of Work requiring storm water pollution prevention measures as indicated in the project Special Provisions. Such payment shall be considered full compensation for all labor, materials, tools, and equipment for completion, and implementation and compliance with the SWPPP.

7-8.7 Drainage Control. The CONTRACTOR shall maintain drainage within and through the work areas. Earth dams will not be permitted in paved areas. Temporary dams of sandbags, asphaltic concrete, or other acceptable material will be permitted when necessary. Such dams shall be removed from the site as soon as their use is no longer necessary.

7-9 PROTECTION AND RESTORATION OF EXISTING IMPROVEMENTS. The CONTRACTOR shall be responsible for the protection of public and private property adjacent to the Work and shall exercise due caution to avoid damage to such property.

The CONTRACTOR shall relocate, repair, replace or reestablish all existing improvements within the project limits (e.g., curbs, sidewalks, catch basins, catch basin screens, driveways, fences, walls, sprinkler systems, signs, utility installations, traffic loops, pavements, structures, survey monuments, landscaping, etc.) that are damaged or removed as a result of the CONTRACTOR's operations or as required by the plans and specifications.

All existing improvements, either within the right-of-way or not, including irrigation lines that are damaged by actions of the CONTRACTOR, shall be restored by the CONTRACTOR to their original or better condition at the CONTRACTOR's expense.

The CONTRACTOR shall mark, as approved by the Engineer, all survey monuments, manholes, valves, substructures, or other items that are visible on the surface and will be covered by his operations. This shall be completed prior to the start of that operation and approved by the Engineer.

Existing traffic striping, pavement markings, centerline reflective markers, and curb markings shall also be considered as existing improvements and the CONTRACTOR shall repaint or replace, at the CONTRACTOR's expense, such striping or markings (except for traffic striping and pavement markings within the limits of the Work) if damaged or if their reflectivity is reduced due to construction operations.

All restoration of existing improvements must occur within the construction completion date, unless directed otherwise by the City Engineer.

Maintenance of street and traffic signal systems that are damaged, temporarily removed or relocated shall be done in conformance with 307-1.5.

Trees, lawns, and shrubbery that are not to be removed shall be protected from damage or injury. If damaged or removed due to CONTRACTOR's operations, they shall be restored or replaced in as nearly the original condition and location as is reasonably possible. Lawns shall be reseeded and covered with suitable mulch.

The CONTRACTOR shall give reasonable notice to occupants or owners of adjacent property to permit them to salvage or relocate plants, trees, fences, sprinklers, and other improvements, within the right-of-way which are designated for removal and would be destroyed because of the Work.

All costs to the CONTRACTOR for protecting, removing, restoring, relocating, repairing, replacing, or reestablishing existing improvements shall be the responsibility of the CONTRACTOR.

7-10 PUBLIC CONVENIENCE AND SAFETY. One week prior to pre-construction meeting, the CONTRACTOR shall submit his/her complete construction schedule to the Engineer for approval. The CONTRACTOR shall submit requests for changes in the schedule to the Engineer for approval at least forty eight (48) hours prior to the scheduled Work.

7-10.1 Traffic and Access. The CONTRACTOR's operations shall cause no unnecessary inconvenience. The access rights of the public shall be considered at all times. Unless otherwise authorized, traffic shall be permitted to pass through the Work, or an approved detour shall be provided.

Safe and adequate pedestrian and vehicular access shall be provided and maintained to: fire hydrants; commercial and industrial establishments; churches, schools and parking lots; service stations and motels; hospitals; police and fire stations; and establishments of similar nature. Access to these facilities shall be continuous and unobstructed unless otherwise approved by the Engineer.

Safe and adequate pedestrian zones and public transportation stops, as well as pedestrian crossings of the Work at intervals not exceeding 90 m (300 feet), shall be maintained unless otherwise approved by the Engineer.

Vehicular access to residential driveways shall be maintained to the property line except when necessary construction precludes such access for reasonable periods of time. If backfill has been completed to the extent that safe access may be provided, and the street is opened to local traffic, the CONTRACTOR shall immediately clear the street and driveways and provide and maintain access.

The CONTRACTOR shall cooperate with the various parties involved in the delivery of mail and the collection and removal of trash and garbage to maintain existing schedules for these services.

Grading operations, roadway excavation and fill construction shall be conducted by the CONTRACTOR in a manner to provide a reasonably satisfactory surface for traffic. When rough grading is completed, the roadbed surface shall be brought to a smooth, even condition satisfactory for traffic.

Unless otherwise authorized, work shall be performed in only one-half of the roadway at one time. One half shall be kept open and unobstructed until the opposite side is ready for use. If one-half a street only is being improved, the other half shall be conditioned and maintained as a detour.

The CONTRACTOR will be required to maintain at least one lane of traffic in each direction through the project area at all times in a manner satisfactory to the Engineer in the form of an engineered traffic control plan. The engineered traffic control plans must be signed by a California registered civil and/or traffic engineer. The plan is a required submittal for review one week prior to the pre-construction meeting.

If traffic control on the project shall be implemented by a sub-contractor, such subcontractor must specialize in Traffic Control and be approved by the City Engineer.

The CONTRACTOR shall include in its Bid all costs for the above requirements.

7-10.1.1 General. One week prior to pre-construction meeting, the CONTRACTOR shall submit his/her complete construction schedule to the Engineer for approval. The CONTRACTOR shall submit requests for changes in the schedule to the Engineer for approval at least forty eight (48) hours prior to the scheduled Work.

7-10.1.2 Parking Restrictions and Posting for Tow Away. No Parking signs, posted by the Contractor, shall be of heavy card stock and not less than 1.75 square feet of surface area on the face. Background color shall be white and letters shall be printed in red water resistant ink except day, date, and time of restriction may be printed in black water resistant ink. The signs shall be printed with the words "Tow Away" and "No Parking" with a character height of not less than 2.75 inches and a stroke width of not less than 0.5 inches. The day, dated, and time of the particular restriction shall be printed or attached below the above mentioned wording in characters of not less than 2.0 inches in height and 0.4 inches in stroke width. The day of the week shall be written out or properly abbreviated with three to four letters; date or dates or restriction shall be listed completely; the beginning and ending times shall be clearly listed on the sign.

Signs shall be mounted such that the wording "No Parking" are at an elevation at least three feet above the adjacent flowline. Signs may be tied with string to trees and power poles, taped to existing sign poles, or mounted to stakes or barricades as provided by the Contractor. The signs shall be placed as needed to control the parking of cars within the construction zone; signs shall be placed at intervals of 75 feet or less along each side of the roadway.

Signs shall be posted and maintained by the Contractor for a period of 72 hours prior to the restrictions becoming effective. The Contractor may only post parking restrictions that are effective for the duration of the Work. Upon completion of the Work, the Contractor shall promptly and completely remove and dispose all signs, stakes, and barricades. The Contractor shall promptly reset or replace all damaged or defective signs.

The Contractor shall be fully responsible for the adequate removal of all parked cars. The Contractor shall coordinate the removal of all vehicles with the City of Auburn Police Department. The Contractor shall notify the City of Auburn Police Department upon posting of the parking restrictions for a particular street. For removal of parked vehicles, the Contractor shall notify the City of Auburn Police Department not less than two hours prior to the needed removal, stating the address nearest the parked vehicle, make, model, color and license number. The City shall not be responsible for any delay or additional costs associated with the removal of parked cars that obstruct the construction operation.

If a vehicle owner successfully contests a towing citation in court, and their citation is dismissed for causes related to the Contractor's failure to perform the requirements of this section, the Contractor shall reimburse the City for the cost of any claims associated with the towing citation.

DEVIATIONS FROM THE REQUIREMENTS OF THIS SUBSECTION WILL BE PERMITTED ONLY ON PRIOR CONSENT OF THE ENGINEER. FAILURE OF THE

CONTRACTOR TO ADHERE TO THE REQUIREMENTS OF THIS SUBSECTION, OR FAILURE OF THE CONTRACTOR TO COMPLETE HIS DAILY SCHEDULE ONCE “TEMPORARY NO PARKING” SIGNS HAVE BEEN POSTED, WILL RESULT IN DAMAGES BEING SUSTAINED BY THE CITY. SUCH DAMAGES ARE, AND WILL CONTINUE TO BE, IMPRACTICABLE AND EXTREMELY DIFFICULT TO DETERMINE. FOR EACH OCCURRENCE OF A VIOLATION, AS PROVIDED HEREIN, THE CONTRACTOR SHALL PAY TO THE AGENCY, OR HAVE WITHHELD FROM MONIES DUE TO IT, THE SUM OF \$1,000.00.

EXECUTION OF THE CONTRACT SHALL CONSTITUTE AGREEMENT BY THE AGENCY AND CONTRACTOR THAT \$1,000.00 PER VIOLATION IS THE MINIMUM VALUE OF THE COST AND ACTUAL DAMAGE CAUSED, THAT SUCH SUM SHALL NOT BE CONSTRUED AS A PENALTY, AND THAT SUCH SUM MAY BE DEDUCTED FROM PAYMENTS DUE THE CONTRACTOR.

7-10.1.3 Notification to the Public Agencies. The CONTRACTOR shall notify the following Agencies 48 hours prior to working in the area within the City of Auburn unless otherwise noted:

City of Auburn Public Works Dept

7-10.2 Storage of Equipment and Materials in Public Streets. Construction materials shall not be stored in streets, roads, or highways for more than 5 days after unloading. All materials or equipment not installed or used in construction within 5 days after unloading shall be stored elsewhere by the CONTRACTOR at its expense unless authorized additional storage time.

Construction equipment shall not be stored at the Work site before its actual use on the Work nor for more than 5 days after it is no longer needed. Time necessary for repair or assembly of equipment may be authorized by the Engineer.

Excavated material, except that which is to be used as backfill in the adjacent trench, shall not be stored in public streets unless otherwise permitted. After placing backfill, all excess material shall be removed immediately from the site.

7-10.3 Street Closures, Detours, Barricades. The CONTRACTOR shall comply with all applicable State, County and City requirements for closure of streets. The CONTRACTOR shall provide barriers, guards, lights, signs, temporary bridges, flagpersons, and watchpersons. The CONTRACTOR shall be responsible for compliance with additional public safety requirements which may arise. The CONTRACTOR shall furnish and install signs and warning devices and promptly remove them upon completion of the Work.

At least 48 hours in advance of closing, partially closing or reopening, any street, alley, or other public thoroughfare, the CONTRACTOR shall notify the Police, Fire, and Public Works Departments, and comply with their requirements. Deviations must first be approved in writing by the Engineer.

The CONTRACTOR shall secure approval, in advance, from authorities concerned for the use of any bridges proposed by it for public use. Temporary bridges shall be clearly posted as to load limit, with signs and posting conforming to current requirements covering “signs” as set forth in the Traffic Manual published by the California Department of Transportation. This manual shall also apply to the street closures, barricades, detours, lights, and other safety devices required.

All traffic control barricades, signs and devices used by the CONTRACTOR shall, as a minimum, conform to the latest edition of the “California Manual on Uniform Traffic Control Devices” (“MUTCD”). Channelization devices shall be spaced no greater than fifty (50) feet apart. The CONTRACTOR shall take additional precautions as he/she may find necessary under the circumstances.

Should the CONTRACTOR fail to provide adequate traffic control or safety barricades, and in the event a responsible individual cannot be located or refuses to perform, the AGENCY will at its option place needed devices or engage a private firm to place and maintain said barricades, which will be charged to the CONTRACTOR directly.

Full street closures will not be allowed without City Council approval.

All costs involved shall be included in the Bid.

7-10.4 Safety.

7-10.4.1. Safety Orders. The CONTRACTOR shall have at the Work site, copies of suitable extracts of: Construction Safety Orders, Tunnel Safety Orders and General Industry Safety Orders issues by the State Division of Industrial Safety. The CONTRACTOR shall comply with provisions of these and all other applicable laws, ordinances, and regulations.

Before excavating any trench 1.5 m (5 feet) or more in depth, the CONTRACTOR shall submit a detailed plan to the AGENCY showing the design of shoring, bracing, sloping, or other provisions to be made for the workers' protection from the hazard of caving ground during the excavation of such trench. If the plan varies from the shoring system standards, the plan shall be prepared by a registered Civil Engineer. No excavation shall start until the Engineer has accepted the plan and the CONTRACTOR has obtained a permit from the State Division of Industrial Safety. A copy of the permit shall be submitted to the Engineer.

Payment for performing all work necessary to provide safety measures shall be included in the prices bid for other items of work except where separate bid items for excavation safety are provided, or required by law.

7-10.4.2 Use of Explosives. Explosive may be used only when authorized in writing by the Engineer, or as otherwise stated in the Specifications. Explosives shall be handled, used, and stored in accordance with all applicable regulations.

The Engineer's approval of the use of explosives shall not relieve the CONTRACTOR from liability for claims caused by blasting operations.

7-10.4.3 Special Hazardous Substances and Processes. Materials that contain hazardous substances or mixtures may be required on the Work. A Material Safety Data Sheet as described in Section 5194 of the California Code of Regulations shall be requested by the CONTRACTOR from the manufacturer of any hazardous products used.

Material usage shall be accomplished with strict adherence to California Division of Industrial Safety requirements and all manufacturer warnings and application instructions listed on the Material Safety Data Sheet and on the product container label.

The CONTRACTOR shall notify the Engineer if a specified product cannot be used under safe conditions.

7-10.4.4 Confined Spaces.

(a) Confined Space Entry Program. The CONTRACTOR shall be responsible for implementing, administering and maintaining a confined space entry program (CSEP) in accordance with Sections 5156, 5157 and 5158, Title 8, CCR.

Prior to starting the Work, the CONTRACTOR shall prepare and submit its comprehensive CSEP to the Engineer. The CSEP shall address all potential physical and environmental hazards and contain procedures for safe entry into confined spaces, including, but not limited to the following:

1. Training of personnel

2. Purging and cleaning of materials and residue
3. Potential isolation and control of energy and material inflow
4. Controlled access to the space.
5. Atmospheric testing of the space
6. Ventilation of the space
7. Special hazards consideration
8. Personal protective equipment
9. Rescue plan provisions

The CONTRACTOR's submittal shall include the names of its personnel, including subcontractor personnel, assigned to the project who will have CSEP responsibilities, their CSEP training, and their specific assignment and responsibility in carrying out the CSEP.

(b) Permit-Required Confined Spaces. Entry into permit-required confined spaces as defined in Section 5157, Title 8, CCR may be required as a part of the Work. All manholes, tanks, vaults, pipelines, excavations, or other enclosed or partially enclosed spaces shall be considered permit-required confined spaces until the pre-entry procedures demonstrate otherwise. The CONTRACTOR shall implement a permit space program prior to performing any work in a permit-required confined space. A copy of the permit shall be available at all times for review by CONTRACTOR and AGENCY personnel at the Work site.

(c) Payment. Payment for implementing, administering, and providing all equipment and personnel to perform the CSEP shall be included in the bid items for which the CSEP is required.

7-11 PATENT FEES OR ROYALTIES. The CONTRACTOR shall absorb in its Bid the patent fees or royalties on any patented article or process furnished or used in the Work. The CONTRACTOR shall indemnify and hold the AGENCY harmless from any legal action that may be brought for infringement of patents.

7-12 ADVERTISING. The names, addresses and specialties of CONTRACTORS, Subcontractors, architects, or engineers may be displayed on removable signs. The size and location shall be subject to the Engineer's approval.

Commercial advertising matter shall not be attached to or painted on the surfaces of buildings, fences, canopies, or barricades.

7-13 LAWS TO BE OBSERVED. The CONTRACTOR shall keep fully informed of State and National laws and County and Municipal ordinances and regulations which in any manner affect those employed in the Work or the materials used in the Work or in any way affect the conduct of the Work. The CONTRACTOR shall at all times observe and comply with such laws, ordinances, and regulations.

7-14 ANTITRUST CLAIMS. Section 7103.5 of the Public Contract Code provides:

“In entering into a public works CONTRACTOR or a subcontract to supply goods, services, or materials pursuant to a public works contract, the CONTRACTOR or subcontractor offers and agrees to assign to the awarding body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec 15) or Cartwright Act (Chapter 2 [commencing with Section 16700] of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the public works contract or subcontract. The assignment shall be made and become effective at the

time the awarding body tenders final payment to the CONTRACTOR, without further acknowledgment by the parties.”

7-15 DAILY REPORT. The CONTRACTOR shall complete a Daily Report indicating manpower, work performed, major equipment used and on standby (itemized separately), subcontractors, and similar items involved in the performance of the Work. The Daily Report shall be completed on forms prepared by the CONTRACTOR and acceptable to the Engineer, and shall be submitted to the City Inspector weekly.

The CONTRACTOR shall submit as requested Certified Payroll Statements for each employee involved with the Work including subcontractors. Submission of certified payroll does not relieve the CONTRACTOR of his responsibility to pay prevailing wage.

SECTION 8 – FACILITIES FOR AGENCY PERSONNEL (NOT APPLICABLE FOR THIS PROJECT)

8-1 GENERAL. All facilities provided for AGENCY personal shall be at suitable locations approved by the Engineer. Such facilities must in a room, building, or trailer provided for this purposes with an acceptable means for locking.

A Class “A” Field Office in accordance with 8-2.1 shall be provided at any offsite plan facility furnishing pipe subject to AGENCY inspection during manufacture. A Field Laboratory in accordance with 8-3.1 shall be provided at any offsite or project site plant facility furnishing Portland cement concrete or asphalt paving material. Any other facilities for AGENCY personnel shall be provided only when required by the Specifications.

Offices and laboratories at plants may be used concurrently by inspection personnel of other agencies provided such use does not seriously conflict with AGENCY use. When facilities are shared in this manner, at least one locker provided with a hasp for a padlock must be available for the exclusive use of AGENCY inspectors. Otherwise any facilities furnished are for the exclusive use of AGENCY personnel.

All facilities shall conform to the applicable codes, ordinances, and regulations of the local jurisdiction and of the State of California, and shall conform to current practice. The interior shall be paneled or suitably lined to provide a facility of good appearance.

The CONTRACTOR shall provide janitorial and other maintenance services in all types of facilities provided. Such services shall include the supply of the appropriate paper products and dispensers. Trash receptacles shall be provided and emptied by the CONTRACTOR at weekly intervals or sooner as required. The trash shall be removed from the project site.

All costs to furnish, maintain, service, and remove the specified facilities at the project site shall be included in the price bid for such facilities. If no bid item is provided in the proposal, costs shall be included in other items for which bids are entered.

The first progress payment will not be approved until all facilities are in place and fully comply with the Specifications.

8-2 FIELD OFFICE FACILITIES.

8-2.1 Class “A” Field Office. This office shall have a minimum floor space of 16 m² (175 ft²), at least one door, and window area of not less than 2 m² (22 ft²). All doors and windows shall be provided with screens.

Furniture shall be provided as follows: one plan table, one standard 1.5 m (5 feet) long double-pedestal desk with a drawer suitable for holding files, two chairs, one drafting stool, and one plan rack.

Electric power shall be provided to include a minimum of four duplex convenience outlets. The office shall be illuminated at the tables and desk. An outdoor lighting fixture with a 300-watt bulb shall be installed.

Heating and air conditioning of sufficient capacity shall be provided at no expense to the AGENCY. The CONTRACTOR shall provide drinking water within the office and integral sanitary facilities directly adjoining. Sanitary facilities shall include a toilet and wash basin with hot and cold running water.

Extended area, non-coin-operated telephone service shall be provided within the office area. The installation shall include sufficient extension code to serve the plan table and desk.

8-2.2 Class “B” Field Office. This office shall be the same as class “A” except that integrated sanitary facilities and air conditioning are not required. A chemical toilet facility shall be provided adjacent to the office.

8-2.3 Class “C” Field Office. The office shall be of suitable proportions with 11 m² (120 ft²) of floor area. It shall be equipped with one 0.9 by 1.5 m (3 by 5 foot) table, four chairs and one plan rack. It shall be adequately heated, ventilated, and lighted and two duplex convenience outlets shall be provided. Air conditioning, telephones, and sanitary facilities are not required.

8-3 FIELD LABORATORIES.

8-3.1 Offsite at Manufacturing Plant. Field laboratories shall conform to the requirements for a Class “C” Field Office specified in 8-2.3 except for the following:

1. Telephone service per 8-2.1.
2. Chair.
3. Work table, 1.2 by 3.0 m (4 by 10 feet), 0.9 m (3 feet) high.
4. Sieves per 203-6.
5. Scales and weights.
6. Burner plate for heating samples.
7. Thermometer, with 90 to 260° C (200 to 400° F) degree range (Asphalt Plants only).
8. Air meter for all concrete in accordance with ASTM C 231 of the type that indicates percentage of air directly (Precast Concrete Plants only)

All sampling and testing equipment shall be maintained in satisfactory operating condition by CONTRACTOR or plant owner. Laboratories shall be located immediately adjacent to and with full view of batching and loading operations.

8-3.2 At Project Site. Field laboratories shall be in accordance with 8-3.1, except that sieves, scales, weights, burner plates, sampling devices, pans, and thermometers will be furnished by the AGENCY at no expense to the CONTRACTOR. If air entraining agents are being used in the Concrete on the project, an air meter of the type described in 8-3.1 shall be furnished by the CONTRACTOR.

8-4 BATHHOUSE FACILITIES. When the Plans or Specifications require bathhouse facilities, the following shall be provided.

1. One lavatory with hot and cold water.
2. One toilet in a stall.
3. One 1 m (3 feet) trough-type urinal.
4. One enclosed shower at least 1 by 1 m (3 by 3 feet) with hot and cold water.

5. One bench, 2 m (6 feet) long.
6. Soap dispensers.
7. Toilet paper holders.
8. Paper towel cabinet.
9. Wastepaper receptacle.

These facilities shall be serviced and provided with necessary sanitary supplies.

These facilities shall be for the exclusive use of AGENCY personnel. However, a separate building need not be provided for this purpose if such facilities are located in a separate room in a building which includes other facilities.

8-5 REMOVAL OF FACILITIES. Field offices, laboratories, and bathhouse facilities at the project site shall be removed upon completion of the Work. Buildings and equipment furnished by the CONTRACTOR at the project site under the provisions of this section are the property of the CONTRACTOR.

8-6 BASIS OF PAYMENT. All costs incurred in furnishing, maintaining, servicing, and removing field officers, laboratories, or bathhouse facilities required at the project site shall be included in the bid item for furnishing such facilities. If such facilities are required by the Plans or Specifications and no bid item is provided in the proposal, the costs shall be included in other items for which bids are entered. Such costs incurred in connection with offices and laboratories at plants shall be borne by the plant owners.

SECTION 9 – MEASUREMENT AND PAYMENT

9-1 MEASUREMENT OF QUANTITIES FOR UNIT PRICE WORK.

9-1.1 General. Unless otherwise specified, quantities of work shall be determined from measurements or dimensions in horizontal planes. However, linear quantities of pipe, piling, fencing and timber shall be considered as being the true length measured along longitudinal axis.

Unless otherwise provided in Specifications, volumetric quantities shall be the product of the mean area of vertical or horizontal sections and the intervening horizontal or vertical dimension. The planimeter shall be considered an instrument of precision adapted to measurement of all areas.

9-1.2 Methods of Measurement. Materials and items of work which are to be paid for on basis of measurement shall be measured in accordance with methods stipulated in the particular sections involved.

9-1.3 Certified Weights. When payment is to be made on the basis of weight, the weighing shall be done on certified platform scales or, when approved by the Engineer, on a completely automated weighing and recording system. The CONTRACTOR shall furnish the Engineer with duplicate licensed weighmaster's certificates showing actual net weights. The AGENCY will accept the certificates as evidence of weights delivered.

9-1.4 Units of Measurement. Measurements shall be in accordance with 1-4.1 and 1-4.2. a metric ton or "tonne" is equal to 1000 kilograms and the unit of liquid measure is a Liter (in U.S. Standard Measures, a pound is an avoirdupois pound; a ton is 2000 pounds avoirdupois; and the unit of liquid measure is a gallon).

9-2 LUMP SUM WORK. Items for which quantities are indicated "Lump Sum", "L.S.", or "Job", shall be paid for at the price indicated in the Bid. Such payment shall be full compensation for the items of work and all work appurtenant thereto.

When required by the Specifications or requested by the Engineer, the CONTRACTOR shall submit to the Engineer within 15 days after award of Contract, a detailed schedule in triplicate, to be used only as a basis for determining progress payments on a lump sum contract or designated lump sum bid item. This schedule shall equal the lump sum bid and shall be such form and sufficiently detailed as to satisfy the Engineer that it correctly represents a reasonable apportionment of the lump sum.

9-3 PAYMENT

9-3.1 General. The quantities listed in the Bid schedule will not govern final payment. Payment to the CONTRACTOR will be made only for actual quantities of Contract items constructed in accordance with the Plans and Specifications. Upon completion of construction, if the actual quantities show either an increase or decrease from the quantities given the Bid schedule, the Contract Unit Prices will prevail subject to the provisions of 3-2.2.1.

The unit and lump sum prices to be paid shall be full compensation for the items of work and all appurtenant work, including furnishing all materials, labor, equipment, tools, and incidentals.

Payment will not be made for materials wasted or disposed of in a manner not called for under the Contract. This includes rejected materials not unloaded from vehicles, material rejected after it has been placed, and material placed outside of the Plan lines. No compensation will be allowed for disposing of rejected or excess material.

Whenever any portion of the Work is performed by the AGENCY at the CONTRACTOR's request, the cost thereof shall be charged against the CONTRACTOR, and may be deducted from any amount due or becoming due from the AGENCY.

Whenever immediate action is required to prevent injury, death, or property damage, and precautions which are the CONTRACTOR's responsibility have not been taken and are not reasonably expected to be taken, the AGENCY may, after reasonable attempt to notify the CONTRACTOR, cause such precautions to be taken and shall charge the cost thereof against the CONTRACTOR, or may deduct such costs from any amount due or becoming due from the AGENCY. AGENCY action or inaction under such circumstances shall not be construed as relieving the CONTRACTOR or its Surety from liability.

Payment shall not relieve the CONTRACTOR from its obligations under the Contract; nor shall such payment be construed to be acceptance of any of the Work. Payment shall not be construed as the transfer of ownership of any equipment or materials to the AGENCY. Responsibility of ownership shall remain with the CONTRACTOR who shall be obligated to store any fully or partially completed work or structure for which payment has been made; or replace any materials or equipment required to be provided under the Contract which may be damaged, lost, stolen or otherwise degraded in any way prior to acceptance of the Work, except as provided in 6-10.

Warranty periods shall not be affected by any payment, but shall commence on the date equipment or material is placed into service at the direction of the AGENCY. In the event such items are not placed into service prior to partial or final acceptance of the project, warranty periods will commence on the date of such acceptance.

If, within the time fixed by law, a property executed notice to stop payment is filed with the AGENCY, due to the CONTRACTOR's failure to pay for labor or materials used in the Work, all money due for such labor or materials will be withheld from payment to the CONTRACTOR in accordance with applicable laws.

At the expiration of 35 calendar days from the date of acceptance of the Work by the City Council, or as prescribed by law, the amount deducted from the final estimate and retained by the AGENCY will be paid to the CONTRACTOR except such amounts as are required by law to be withheld by properly

executed and filed notices to stop payment, or as may be authorized by the Contract to be further retained.

9-3.2 Partial and Final Payment. The Engineer will, after award of Contract, establish a closure date for the purposes of making monthly progress payments. The CONTRACTOR may request in writing that such monthly closure date be changed. The Engineer may approve such request when it is compatible with the AGENCY's payment procedure.

From each progress estimate, 5 percent will be deducted and retained by the AGENCY, and the remainder less the amount of all previous payments will be paid. After 50 percent of the Work has been completed and if progress on the Work is satisfactory, the deduction to be made from remaining progress estimates and from the final estimate may be limited to \$500 or 5 percent of the first half of total Contract amount, whichever is greater.

No progress payment made to the CONTRACTOR or its sureties will constitute a waiver of the liquidated damages under 6-9.

On not later than the fifth day of every month, the Contractor shall present to the Director of Public Works and invoice covering the total quantities under each item of work that have been completed, from the start of the job up to and including the last day of the preceding month, and the value of the work so completed determined in accordance with the schedule of unit prices for such items together with such supporting evidence as may be required by the Director of Public Works. This invoice shall also include an allowance for the cost of such material required in the permanent work as has been delivered to the site but not as yet incorporated in the work.

On not later than the thirtieth of the month, the City shall, after deducting previous payments made, pay to the Contractor ninety (90) percent of the amount of the invoice. No such estimate or payment shall be required to be made, when, in the judgment of the Director of Public Works, the work is not proceeding in accordance with the provisions of the contract, or when in his or her judgment the total value of the work done since the last estimate amounts to less than three hundred dollars (\$300). However, payments will be withheld pending receipt of any outstanding reports required by the Contract Documents. In addition, the final progress payment will not be released until the Contractor returns the control set of plans and specifications showing the as-built conditions.

However, payments will be withheld pending receipt of any outstanding reports required by the Contract Documents. In addition, the final progress payment will not be released until the CONTRACTOR returns the control set of plans and specifications showing the as-built conditions.

The full five (5) percent retention will be deducted from all payments. The final retention will be authorized for payment thirty five (35) days after the date of recordation of the Notice of Completion.

The CONTRACTOR may substitute securities for any monies withheld by the AGENCY to ensure performance under the Contract as provided in Public Contract Code Sections 10263 and 22300.

When provided for in the Specifications, and subject to the limitation and conditions therein, the cost of materials and equipment delivered but not incorporated into the Work will be included in the progress estimate.

9-3.3 Delivered Materials. Materials and equipment delivered but not incorporated into the Work shall not be submitted for payment and shall not be included in the estimate for progress payment

9-3.4 Mobilization. When a bid item is include in the Proposal form for mobilization and subject to the conditions and limitations in the Specifications, the costs of work in advance of construction operations and not directly attributable to any specific bid item will be included in the progress estimate. When no such bid item is provided, payment for such costs will be considered to be included in the other items of work.

SECTION F

2022 SEWER IMPROVEMENTS PROJECT IN THE CITY OF AUBURN, CALIFORNIA

TECHNICAL SPECIFICATIONS

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IN THE CITY OF AUBURN, CA**

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SECTION 01010

GENERAL CONSTRUCTION INFORMATION AND REQUIREMENTS

PART 1: GENERAL

1.01 DESCRIPTION

This section covers the general requirements for the Contractor's temporary facilities at the job site and for the prosecution of the work.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01020: Modification of Existing Facilities and Order Of Work
- B. Section 01300: Submittals
- C. Section 01330 Safety Plan
- D. Section 1700: Contract Closeout
- E. Section 02513 Asphalt Concrete Paving
- F. Section 02273: Construction Activities Stormwater Best Management Practices
- G. Section 11010: General Mechanical Equipment Provisions
- H. Section 16050: General Electrical
- I. Section 16940: Instrumentation

1.03 GENERAL NATURE OF THE WORK

- A. The work involves furnishing of labor, equipment, and materials necessary to complete the 2022 Sewer Improvements Project, including, but not limited to:
 - 1. Removal of old, damaged, or compromised sewer mains at various locations in the City of Auburn as specified in the Project Drawings.
 - 2. Furnishing and installation of new SDR26 PVC sewer pipe.
 - 3. Cured in place pipe lining existing, compromised sewer lines as indicated on the Project Drawings.
 - 4. Furnishing and installation of new flushing lines on replaced sewer lines as specified in the Project Drawings.
 - 5. Reconnection of disrupted service laterals as necessary
 - 6. Removal of root infiltration and debris in select sanitary sewer manholes (SSMHs) identified herein

7. Rehabilitation of existing manhole barrel seams as specified.
8. Patch-paving as necessary due to sewer replacement and manhole rehabilitation efforts.
9. Removal and replacement of sidewalk and curb and gutter disturbed by sewer replacement activities as necessary
10. Traffic control as necessary

B. Except as specifically noted otherwise, provide and pay for:

1. Insurance and bonds.
2. Labor, materials, and equipment.
3. Tools, equipment, and machinery required for construction.
4. Utilities required for construction.
5. Temporary facilities including pumping, bypass piping, sheeting, and shoring.
6. Traffic control and dust control measures.
7. Other facilities and services necessary for proper execution and completion of the Work.

C. Secure and pay for all permits including, but not limited to, OSHA excavation permits, Storm Water Pollution Prevention Permit, Placer County Air Pollution Control District, Department of Transportation permits, government fees, and licenses.

D. Comply with codes, ordinances, regulations, orders, and other legal requirements of public authorities having bearing on the performance of the Work.

1.04 LOCATION OF THE PROJECT SITE

The Project is a compilation of miscellaneous sewer improvement items throughout the City of Auburn and therefore inherently, the Project has no main or central site. The location of work described herein shall be as specified on the Project Drawings.

1.05 ACCESS TO THE SITE

Access to the project site shall be as shown on the plans or as directed by the Engineer.

1.06 ACTIVITIES BY OTHERS

A. OWNER, utilities, and others may perform activities within Project area while the Work is in progress.

1. Schedule the Work with Owner, utilities, and others to minimize mutual interference.

- B. Cooperate with others to minimize interference and delays.
 - 1. When cooperation fails, submit recommendations and perform Work in coordination with work of others.

1.07 COORDINATION OF WORK

- A. Maintain overall coordination of the Work.
- B. Obtain construction schedules from each subcontractor, and require each subcontractor to maintain schedules and coordinate modifications.
- C. Agency shall provide software for construction management. The contractor shall use the software to communicate with the Agency. The software shall be used for document management, finance controls, reporting, administration, Construction documents (RFIs, Submittals, and Inspection Schedules).

1.08 EARLY OCCUPANCY OF PORTIONS OF WORK

- A. Certificates of Substantial Completion will be executed for each designated portion of Work prior to Owner occupancy.
 - 1. Such certificate of Substantial Completion will describe the portion of the Work to be occupied by Owner, items that may be incomplete or defective, date of occupancy by Owner, and other information required by Owner and Contractor.
- B. After Owner occupancy, allow access for Owner's personnel, access for others authorized by Owner, and Owner operation of equipment and systems.
- C. Following occupancy, Owner will:
 - 1. Provide power to operate equipment and systems.
 - 2. Provide chemicals to operate equipment and systems (i.e. polymer)
 - 3. Repair damage caused by Owner's occupancy.

PART 2: MATERIALS

2.01 MATERIALS

See Divisions 2 through 16 for materials and methods of installation.

PART 3: EXECUTION

3.01 CONTRACTOR'S PLANT AND EQUIPMENT

- A. Security: The Contractor shall at all times be responsible for the security of his plant and equipment. The Owner will not take any responsibility for missing or damaged equipment, tools or personal belongings.

- B. Contractor's Field Office: The Contractor is responsible for acquiring and locating desired field offices (Not Applicable to this Project).
- C. Workshop and Storage Facilities: The Contractor shall provide storage buildings for the protection of equipment, materials, supplies and tools. The building used for the storage of materials which deteriorate when exposed to moisture shall be moisture proof. Workshops and storage buildings shall be located as designated by the Engineer, and shall be clean and in proper order at all times. The Contractor shall be responsible for acquiring a location for the placement of said facilities (Not Applicable to this Project). .

3.02 CONTRACTOR'S UTILITIES

- A. Power: The Contractor shall be responsible for obtaining and maintaining power for the purposes of construction, and for any field offices or ancillary structures installed by the Contractor for his use during construction.
- B. Water: Water used for the purposes of construction or for the Contractor's use shall be available from hydrants throughout the City in coordination with the City. The Contractor is required to obtain a hydrant permit from Placer County Water Agency and pay all associated costs and fees. Compensation for these fees is to be included in the various items of work and a separate payment to water will not be made. The Contractor shall provide equipment, power and labor as required to utilize water as approved by the Engineer.
- C. Telephone: The Contractor shall be responsible for their own cellular phone and internet service connections.
- D. Sanitary Facilities: The Contractor shall be responsible for obtaining and maintaining sanitary facilities for the purposes of construction, and for any additional field offices or ancillary structures installed by the Contractor for use during construction.
- E. Temporary Heating: The Contractor shall be responsible for providing temporary heating, covering and enclosures as necessary to protect all work and material against damage by dampness and cold and to facilitate completion of the work. The Contractor shall supply all the fuel, equipment and materials required for temporary heating, in accordance with manufacturer's recommendations.
- F. The Contractor's use of the project site and facilities for personnel housing shall be subject to review and approval by the Engineer.

3.03 LANDS PROVIDED BY OWNER

The Owner will not provide lands required for the Contractor's staging or field offices.

3.04 LANDS PROVIDED BY CONTRACTOR

The Contractor shall provide, with no liability to the Owner, any additional land and access thereto not shown or described that may be required for temporary construction facilities or storage of materials. He/she shall construct all access roads, detour roads or other temporary works as required by his operations. The Contractor shall confine his equipment, storage of materials and

operation of his workmen to those areas shown and described and such additional areas as he may provide.

3.05 PRECONSTRUCTION PHOTOS

The Contractor shall, before mobilization begins, submit two binders of hard copy printouts, and/or the electronic document equivalent – (i.e.; a PDF file), and electronic files of digital preconstruction photos of the work area. Each photo shall include a date stamp as part of the image. The electronic binder and photo files shall be provided in JPEG format at the good quality compression setting with a camera resolution of 8 megapixels minimum on a USB thumb drive to be provided with each binder, or electronically submitted in a manner approved by the Engineer. The hard copy image printouts shall be full color, a maximum of two prints to a page, each print a minimum size of 5 inches by 7 inches, with a printed image quality of at least 300dpi. Each printed image shall be labeled with the electronic image file name, the location and direction it was taken, and a short description of the subject. The Engineer may designate the locations and subject of up to 50 photos, but the Contractor may wish to take more images to fully document the existing conditions of the site or facilities before work begins. All such photos shall be included in the aforementioned submittal.

3.06 CONSTRUCTION PHOTOS

The Contractor shall, as requested by the Engineer, submit two binders of hard copy printouts, and/or the electronic document equivalent – (i.e.; a PDF file), and electronic files of digital construction photos documenting the progress of the work. Each photo shall include a date stamp as part of the image. The electronic photo files shall be provided in JPEG format at the highest quality compression setting with a camera resolution of 8 megapixels minimum on a USB thumb drive to be provided with each binder. The hard copy image printouts shall be full color, a maximum of two prints to a page, each print a minimum size of 5 inches by 7 inches, with a printed image quality of at least 300dpi. Each printed image shall be labeled with the electronic image file name, the location and direction it was taken, and a short description of the subject. The Engineer may designate the locations and subject of up to 50 photos each month as long as the work is in progress. Upon completion of the work, additional photos shall be taken of the subjects and locations depicted in the preconstruction photographs and submitted as described above.

3.07 SHIPPING AND PROTECTION OF EQUIPMENT

- A. Definition: For the purpose of this article "equipment" means any mechanical, electrical or instrumentation devices or any items with one or more moving parts.
- B. Packing and Marking:
 - 1. All equipment shall be adequately and effectively protected against damage from moisture, dust, handling or other cause during transport from manufacturer's or supplier's premises to site.
 - 2. Each item or package shall be clearly marked with a fitting or distinguishing mark which shall be shown on the packing lists. Copies of packing lists shall be delivered to the Engineer.

3. Stiffeners shall be used where necessary to maintain shapes and to give rigidity. Parts of equipment shall be delivered in assembled or sub-assembled units where possible.
- C. Identification of Equipment: Each item of equipment shall have firmly affixed to it a label or tag with its equipment number or other discrete identifying mark.
- D. Storage of Equipment: During the interval between the delivery of equipment to the site and installation, all equipment shall be safely stored in a manner acceptable to the Engineer. Equipment shall be stored in an enclosed space affording protection from vandalism, weather, dust and mechanical damage and providing favorable temperature, humidity and ventilation conditions to ensure against equipment deterioration. Rotating equipment shall be turned or exercised as recommended by the Manufacturer.
- E. Protection of Equipment After Installation: After installation, all equipment shall be protected as specified for existing installations in Article 3.10 of the General Conditions. During concrete operations, including finishing, all equipment that may be affected by cement dust must be completely covered. During painting operations, all grease fittings and similar openings shall be covered to prevent the entry of paint. Electrical switch-gear, unit substation and motor load centers shall not be installed until after all concrete work and sandblasting in those areas have been completed and accepted.
- F. Delivery of Equipment: The Owner's personnel will not accept materials or equipment deliveries for the Contractor.

3.08 TESTS AND INSPECTION

- A. General Requirements: All materials, equipment, installation and workmanship included in this contract, if so required by the Engineer, shall be tested and inspected to prove compliance with the contract requirements. No tests specified herein shall be applied until the item to be tested has been inspected and approval given for the application of such test.
- B. Tests and inspections shall include:
 1. The delivery acceptance test and inspections.
 2. The installed tests and inspections of items as installed.
- C. Tests and inspections, unless otherwise specified or accepted, shall be in accordance with the recognized standards of the industry.
- D. The form of evidence of satisfactory fulfillment of delivery acceptance test and of installed test and inspection requirements shall be, at the discretion of the Engineer, either by tests and inspections carried out in his presence or by certificates or reports of tests and inspections carried out by approved persons or organizations.
- E. Delivery Acceptance Tests and Inspections: The delivery acceptance tests and inspections shall be at the Contractor's expense for any materials or equipment specified and shall include the following:

1. Test of items during the process of manufacture and/or on completion of manufacture, comprising material tests, hydraulic pressure tests, electric tests, performance and operating tests and inspections in accordance with the relevant standards of the industry and more particularly as detailed in individual sections of these specifications, or as may be required by the Engineer to satisfy himself that the items tested and inspected comply with the requirements of this contract.
2. Inspection of all items delivered at the site in order to satisfy the Engineer that such items are of the specified quality and workmanship and are in good order and condition at the time of delivery.

F. Installed Tests and Inspection:

1. All mechanical and electrical equipment shall be tested by the Contractor to the satisfaction of the Engineer before any facility is put into operation. Tests shall be specified herein and shall be made to determine whether the equipment has been properly assembled, aligned, adjusted and connected. Any changes, adjustments or replacements required to make the equipment operate as specified shall be carried out by the Contractor as part of the work and be pre-approved by the manufacturer.
2. At least 30 days before the time allowed in his construction schedule for commencing testing and start-up procedures, the Contractor shall submit to the Engineer, in duplicate, details of the procedures he proposes to adopt for testing and start-up of all mechanical and electrical equipment to be operated singly and together.
3. During the testing of equipment, the Contractor shall make available experienced factory trained representatives of the manufacturers of all the various pieces of equipment, or other qualified persons who shall instruct the Owner's personnel in the operation and care thereof. Instruction shall include step-by-step troubleshooting procedures with all necessary test equipment. All manufacturer's instructions shall be provided in writing.
4. During the performance tests, data shall be taken and recorded to demonstrate that all equipment and systems comply with manufacturer's submitted data and other requirements of the contract.
5. If under test, any portion of the work should fail to fulfill the contract requirements and is altered, renewed or replaced, tests on that portion when so altered, removed or replaced, together with all other portions of the work as are affected thereby, shall, if so required by the Engineer, be repeated within reasonable time and in accordance with the specified conditions, and the Contractor shall pay to the Owner all reasonable expenses incurred by the Owner as a result of the carrying out of such tests.
6. If any doubt, dispute or difference should arise between the Engineer and the Contractor regarding the test results or the methods or equipment used in the carrying out of a test, the Engineer may order the test to be repeated using modified methods or equipment. If the repeat test substantially confirms the Engineer's

position on the previous test, all costs in connection with the repeat test will be paid by the Contractor, otherwise the costs shall be borne by the Owner. Where the results of any installed test fail to meet the contract requirements, repeat tests to achieve the contract requirements shall be made at the Contractor's expense.

3.09 RESTORATION OF STRUCTURES AND SURFACES

- A. Structures, Equipment & Pipework: The Contractor shall remove such existing structures, equipment, and pipework as may be necessary for the performance of the work and shall rebuild or replace the items thus removed to original or better condition. He shall repair any existing structures which may be damaged as a result of his work.
- B. Roads and Streets: All roads and streets in which the surface is removed, broken or damaged, or in which the ground has caved or settled due to work under this contract, shall be completely restored and brought to the original grade and crown section unless otherwise indicated. Before resurfacing material is placed, edges of pavements shall be trimmed back far enough to provide clean, solid, vertical faces, and shall be free of any loose material. Roadways used by the Contractor for hauling materials, equipment, supplies, etc., shall be cleaned and repaired if the condition of the roadway is damaged or otherwise affected due to the Contractor's operations. Repaving and repairs shall be done in accordance with Section 02513 – Asphalt Concrete Paving.
- C. Cultivated Areas and Other Surface Improvements: All cultivated and natural areas, either agricultural or lawns, and other surface improvements which are damaged by actions of the Contractor shall be restored, including roadside drainage ditches, as nearly as possible to their original condition or better.

3.10 SAFETY

- A. The Contractor shall execute and maintain his work so as to avoid injury or damage to any person or property. All work shall be done in conformance with the State of California Division of Industrial Safety and OSHA Standards.
- B. Safety precautions as applicable shall include, but not be limited to, adequate life protection, and lifesaving equipment; adequate illumination for underground and night operations; instructions in accident prevention for all employees; such machinery guards, walkways, scaffolds, ladders, bridges, and other safety devices, equipment and wearing apparel as are necessary or lawfully required to prevent accidents or injuries, and the proper inspection and maintenance of all safety measures.
- C. The names and telephone numbers of at least two medical doctors practicing in the vicinity and the telephone number of the local ambulance shall be prominently displayed adjacent to all telephones.
- D. The Contractor shall develop and maintain a Construction Safety Plan as stipulated in Section 01330.

3.11 CONTRACTOR'S PERSONNEL PROTECTION

- A. The Contractor is warned that sewage may contain infectious bacteria, viruses and other disease-bearing organisms. It is the Contractor's responsibility to urge his personnel to observe a strict regimen of proper hygienic precautions, including any inoculations recommended by the public health officer.
- B. Because of the danger of solvents, gasoline and other hazardous materials being carried in raw sewage, sewer lines and manholes are considered hazardous to open flame, sparks or unventilated occupancy. The Contractor shall be aware of these dangers and shall take the necessary measures to assure his personnel observe proper safety precautions when working in these areas.

3.12 TRENCH SAFETY

- A. Attention is directed to the provisions of Section 6705 of the Labor Code of the State of California.
- B. Excavation for any trench 5 feet or more in depth shall not begin until the Contractor has submitted to the Engineer, with the resolution of "No exceptions taken" of the Contractor's detailed plan for worker protection from the hazards of caving ground during the excavation of such trench. Such plan shall be submitted in accordance with Section 01300 and shall show the details of the design of shoring, bracing, sloping, or other provisions to be made for worker protection during such excavation. No such plans shall allow the use of shoring, sloping or a protective system less effective than that required by the Construction Safety Orders of the Division of Industrial Safety and if such plan varies from the shoring system standards established by the Construction Safety Orders, the plan shall be prepared and signed by an Engineer who is registered as a Civil or Structural Engineer in the State of California.
- C. In addition, the Contractor shall obtain, pay for, and comply with all provisions of the permit required by Section 6500 of the California Occupational Safety and Health Act of 1973. A copy of permit must be submitted per Section 01300.
- D. In accordance with the provisions of Section 6707 of the State Labor Code, each bidder shall list, in the Bid Items indicated, the amount contained in his proposal for adequate trench and excavation, sheeting, shoring, and bracing or equivalent method for the protection of life and limb which shall conform to applicable Safety Orders. By listing this sum in his proposal, the bidder warrants that his action does not convey tort liability to the Owner, the Owner's employees, or the Engineer.

END OF SECTION

SECTION 01020

MODIFICATION OF EXISTING FACILITY AND ORDER OF WORK

PART 1: GENERAL

1.01 SCOPE

This section covers the care of and work to be done on 2022 Sewer Improvements Project at the site of the work, the requirements for providing continuous sewage and processes water/chemical conveyance during construction activities, and other requirements affecting the sequence of construction.

The Order of Work contained herein specifies required sequencing and/or timing of construction activities.

1.02 GENERAL CONSTRAINTS ON SEQUENCE AND SCHEDULING OF WORK

- A. Conduct work in a manner that will not impair the operational capabilities of essential elements of the wastewater treatment plant.
- B. Work sequence and constraints:
 - 1. Gather and submit long lead time items (see paragraph 3.03-C).
 - 2. Sequence construction to minimize number and duration of process shut-downs or bypass pumping, and minimize disruptions in service.
 - 3. Order of work and constraints presented do not include all items affecting completion of the Work, but are intended to describe critical events necessary to minimize disruption of the existing facilities, and complete the work in the allotted contract time.

PART 2: PRODUCTS

2.01 MATERIALS

See Divisions 2 through 17 for materials required.

PART 3: EXECUTION

3.01 INTERFERENCE WITH EXISTING LINES

- A. The Contractor will be required to relocate or replace any pipe lines, electric conduits, or other facilities which must be disturbed for new construction work and which are required for facility operation, or make other arrangements satisfactory to the Engineer. Such relocation and replacement may be of temporary type, to be used until work is completed. In the event of accidental damage to existing lines resulting in interruption of service to yard or building lighting circuits or to any other facility which may be needed for use by the Owner prior to the Contractor's next regularly scheduled work period, the Contractor shall repair to the satisfaction of the Engineer such lines prior to stopping work on the day of such damage.

3.02 DEWATERING AND CLEANING OF STRUCTURES AND PIPELINES

- A. The Contractor will dewater structures and pipelines through existing infrastructure, portable pumps or a vacuum “Vactor” truck. It will be the Contractor's responsibility to provide necessary pumps, piping, and other equipment to complete the cleaning and drainage of the structures and pipelines. Dewatering operations shall be conducted in close coordination with City operations staff; no discharges to drainage courses will be permitted.
- B. All flushing and cleaning of dewatered structures shall be done by the Contractor in a manner satisfactory to the Engineer. In all cases the Contractor shall conform with OSHA requirements for work in confined spaces, including the provision of adequate ventilation.

3.03 ORDER OF WORK

- A. General: The work shall be accomplished in an order that will allow the completion of all improvements shown on the Plans, the Specifications, and the Contract Documents within **fifty (50) working days** after the commencement date stated in the Notice to Proceed.
- B. Order of work subject to change by the Engineer. If modifications are necessary, they may be requested in writing for approval of the Engineer.
- C. Coordinate and provide submittals for long lead time items within the first twenty (20) working days after the Notice to Proceed. Long lead time items include but are not limited the following:
- D. Operational Constraints for major components of the Project are as follows:
 - 1. Traffic control is required for all
 - 2. Bypass pumping

END OF SECTION

Section 01050

SURVEY CONTROL

PART 1: GENERAL

1.01 DESCRIPTION

This section describes the survey information the Owner will provide to the Contractor.

1.02 SURVEY CONTROL INFORMATION PROVIDED BY OWNER

The Owner will provide one set of the construction survey controls as indicated on the general site plan at no charge to the Contractor.

1.03 SURVEY CONTROL PROVIDED BY CONTRACTOR

All survey control necessary to complete the work to the lines and grades shown in the contract documents, other than provided for in Section 1.02, shall be provided by the Contractor at no additional cost to the Owner.

1.04 TOLERANCES FOR CONTRACTOR'S MEASUREMENTS

A. The Contractor's measurements for all stakes, marks, or points set for line, grade, or distance shall be to the nearest 1/100 foot and shall not deviate by more than 2/100 foot from the control line, grade, or distance except as follows:

1. Slope stakes for rough excavation may be set to the nearest 1/10 foot;
2. Trench subgrade shall be established to within 1/10 foot above plan subgrade. The use of a grade pole to establish trench subgrade will be permitted; and
3. Pipe subgrade and joint stakes shall be set to within 2/100 foot of plan subgrade and joint station. Use conventional survey instruments and techniques whenever this degree of accuracy cannot be obtained by use of a grade pole.

The Contractor's measurements of lines, grades, and distances will be subject to checking by the Owner's Representative. The Contractor shall correct immediately any such measurements which do not comply with the above tolerances.

PART 2: MATERIALS

Not Used.

PART 3: EXECUTION

3.01 DESCRIPTION

The Contractor is responsible for protecting and maintaining all survey control on the project at no additional cost to the Owner.

END OF SECTION

SECTION 01200

PAYMENT PROCEDURES

PART 1: GENERAL

1.01 SUMMARY

- A. Section Includes: Procedures for submitting applications for payment and means used as a basis for Progress Payments, including:
 - 1. Cost Summaries.
 - 2. Payment for Mobilization.
 - 3. Start-up.
 - 4. Demobilization.
- B. Related Sections:
 - Section 01320 - Schedule of Values.

1.02 BASIS FOR PROGRESS PAYMENTS

- A. Base Application for Payment on the breakdown of costs for each scheduled activity in the Progress Schedule and the Percentage of Completion for each activity.
- B. Generate Application for Payment by downloading cost data from the Progress Schedule to a spreadsheet type format. Identify each activity on the Progress Schedule that has a cost associated with it, the cost of each activity, the estimated Percent Complete for each activity, and the Value of Work Completed for both the payment period and job to date.

1.03 COST SUMMARIES

- A. Prepare Summary of Cost Information for each subcategory of each Major Item of Work listed in the Schedule of Values. Identify the Value of Work Completed for both the payment period and job to date.
- B. Cash Flow Summary: Prepare cash flow summary, indicating total dollar amount of work planned for each month of the project. Equate sum of monthly amounts to Lump Sum contract price.

1.04 PAYMENT FOR MOBILIZATION

- A. Limit amounts included under Mobilization to the following items:
 - 1. Moving on the site any equipment required for first month operations.
 - 2. Installing temporary construction power and wiring.
 - 3. Establishing fire protection plan and safety program.
 - 4. Developing construction water supply.

5. Providing field office trailers for the CONTRACTOR and the ENGINEER, complete with all specified furnishings and utility services.
 6. Providing on-site sanitary facilities and potable water facilities as specified.
 7. Arranging for and erection of CONTRACTOR's work and storage yard.
 8. Submit all required insurance Certificates and bonds.
 9. Obtaining all required permits, licenses, and fees.
 10. Developing construction schedule.
 11. Submit preliminary schedule of values of the Work.
 12. Provide and erect the project sign.
 13. Post all OSHA, (state agency), Department of Labor, and all other required notices.
 14. Location and flagging of construction and clearing.
 15. Have CONTRACTOR's project manager and/or general superintendent on job site full-time.
- B. Furnish data and documentation to substantiate the amounts claimed under mobilization.
- C. Limit price for mobilization to no more than 5 percent of the Contract Price.
- D. No payment for mobilization, or any part thereof, will be recommended until all mobilization items listed above have been completed.

1.05 PAYMENT FOR START-UP AND DEMOBILIZATION

Prices for start-up and demobilization must total at least 3 percent of the Contract Price.

PART 2: PRODUCTS

Not Used.

PART 3: EXECUTION

Not Used.

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1: GENERAL

1.01 DESCRIPTION

Submittals covered by these requirements include manufacturers' information, shop drawings, test procedures, test results, samples, and requests for substitutions, trench safety plan and miscellaneous work-related submittals. Submittals shall also include, but not be limited to, all mechanical, electrical and electronic equipment and systems, materials, reinforcing steel, fabricated items, detailed piping layout drawings, and conduit details. The Contractor shall furnish all drawings, specifications, descriptive data, certificates, samples, tests, methods, schedules, and manufacturer's installation and other instructions as specifically required in the contract documents to demonstrate fully that the materials and equipment to be furnished and the methods of work comply with the provisions and intent of the Contract Documents.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01010 (3.09): Operating and Maintenance Manuals
- B. Section 01310: Construction Schedule
- C. Section 01320: Schedule of Values

1.03 SUBMITTAL PROCEDURE

- A. The Contractor shall prepare and submit to the Owner within two weeks after the date of the Preconstruction Conference a complete list of shop drawings and material submittals intended to be delivered. No payment will be made to the Contractor until this list is reviewed and found acceptable to the Owner and the Resident Engineer.
- B. At least 30 days prior to his need for approval, the Contractor shall forward to the Engineer all submittals required by the individual sections of the specifications. Unless a different number is called for in the individual sections, submit an electronic and one hard copy of each shop drawing, two copies of all operation and maintenance manuals, and two specimens of each sample requested. An electronic copy of each submittal will be returned to the Contractor, except all sample specimens will be retained by the Engineer.
- C. Identify all submittals including schedules and operation and maintenance manuals on the transmittal form as included in this Section. Obtain an electronic or original copy from the Engineer. Submittals must include submittal number, specification section, plan page reference number (where applicable), the supplier, etc. The Contractor shall also indicate under "Remarks", if the submittal is on the critical path and requires an expedited review. If the Contractor desires more than two copies, he shall transfer the Engineer's comments onto additional copies at his own expense.
- D. Submittals that are related to or affect each other shall be forwarded simultaneously as a

package to facilitate coordinated review. Uncoordinated submittals will be rejected. Do not combine unrelated materials in the same submittal.

- E. The Engineer reserves the right to require submittals in addition to those called for in individual sections.
- F. The Contractor shall schedule submittals to avoid concentration of submittals in a short time period. Scheduling of submittals shall be included in the Contractor's Progress Schedule.
- G. If the Contractor submits shop drawings of equipment by manufacturers other than those listed in the specifications, he shall provide the following information with the submittal:
 - 1. The name and address of at least three companies or agencies who are currently using the equipment.
 - 2. The name and telephone number of at least one person at each of the above companies or agencies whom the Engineer may contact.
 - 3. A description of the equipment that was installed at the above locations. The description shall be in sufficient detail to allow the Engineer to compare it with the equipment that is proposed to be installed in this project.
 - 4. Refer to Engineer's approval (1.05, Part C).
- H. A copy of the specification section, and all referenced and applicable sections, with any addendum updates included, shall be submitted with each paragraph check-marked to indicated specification compliance or marked to indicate requested deviations from specification requirements. Check marks (✓) shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated, and therefore requested by the Contractor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specifications. The submittal shall be accompanied by a detailed, written justification for each deviation. Failure to include a copy for the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.

1.04 SHOP DRAWINGS

- A. The term "shop drawings" includes drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, performance and test data, and similar materials furnished by the Contractor to explain in detail specific portions of the work required by the Contract.
- B. The Contractor shall coordinate all such drawings, and review them for legibility, accuracy, completeness, and compliance with contract requirements, and shall indicate his approval thereon as evidence of such coordination and review. Shop drawings submitted to the

Engineer without evidence of the Contractor's approval will be returned for resubmission.

- C. Approval by the Engineer shall not relieve the Contractor from responsibility for any errors or omissions in such drawings, nor from responsibility for complying with requirements of this Contract, except with respect to variations described and approved in accordance with Paragraph D below.
- D. If shop drawings show variations from contract requirements, the Contractor shall describe such variations in writing, separate from the drawings, at time of submission. All such variations must be approved by the Engineer.

1.05 ENGINEER'S APPROVAL

- A. The Engineer will indicate his acceptance or disapproval of each submittal, and his reasons for disapproval.
 - 1. If no corrections are required, the copies will be returned marked "NO EXCEPTIONS TAKEN" and work may begin immediately on incorporating the material and equipment covered by the submittal into the project.
 - 2. If limited corrections are required, the copies will be returned marked "MAKE CORRECTIONS NOTED". Work may begin immediately on incorporating the material and equipment covered by the corrected submittal into the project.
 - 3. If insufficient or incorrect data has been submitted, the copies will be returned marked "AMEND & RESUBMIT". No work incorporating the material and equipment covered by this submittal into the project may begin until the submittal has been revised, resubmitted, and returned marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED".
 - 4. If the submittal is unacceptable, the copies will be returned marked "REJECTED - SEE REMARKS". No work incorporating the material and equipment covered by this submittal into the project may begin until a new submittal has been made and returned marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED".
- B. The Contractor shall not change any drawing after it has been marked NO EXCEPTIONS TAKEN or MAKE CORRECTIONS NOTED, or change any approved equipment or material without written permission of the Engineer. The Contractor shall comply with all submittals as marked by the Engineer, to the extent applicable.
- C. If more than TWO submittals for a single item are required because of incorrect or insufficient data, or the submittal is unacceptable, or because the Contractor wishes to change previously approved material, then all costs incurred by the Owner for the additional review shall be deducted from monies due the Contractor.

1.06 OPERATION AND MAINTENANCE MANUALS

Manufacturer's printed instructions shall include installation instructions, operating instructions,

schematics for electrical and hydraulic systems, maintenance literature, lubrication requirements, and parts lists. Refer to Section 01010, paragraph 3.10 for specifics required for the operation and maintenance instructions.

1.07 CERTIFICATES

For those items called for in individual sections, furnish certificates from manufacturers, suppliers, or others certifying that materials or equipment being furnished under the Contract comply with the requirements of these specifications.

1.08 SAMPLES

Samples shall be of sufficient size to clearly illustrate functional characteristics and full range of color, texture, and pattern. A completed submittal review transmittal form must accompany each submitted sample.

1.09 CONSTRUCTION SCHEDULE

As soon as possible after receiving Notice of Award and before any work starts, submit a Construction Schedule in accordance with Section 01310 showing estimated starting and completion dates for each part of the work. The first progress payment will not be issued until the progress schedule is submitted and approved.

1.10 SCHEDULE OF VALUES

Submit a schedule of dollar values in accordance with Section 01320 for the various portions of the work. The schedule shall be based on the Contract Bid Schedule or Bid Form and shall include all bid items. The schedule of values in conjunction with the construction schedule will be the basis of the monthly progress payments.

1.11 REVIEW OF SCHEDULES

Submit Schedule of Values and Construction Schedule as a package. Both the Progress Schedule and the Schedule of Values shall be subject to review by Engineer both for format and content.

PART 2: MATERIALS

Not Used.

PART 3: EXECUTION**3.01 CONTRACTOR'S JOBSITE DRAWINGS**

Provide and maintain on the jobsite one complete set of full-size prints of all drawings which form a part of the contract. Immediately after each portion of the work is installed, indicate all deviations from the original design shown on the drawings either by additional sketches or ink thereon. Upon completion of the project, deliver this record set to the Owner's Representative.

A condition of the processing of Progress Payments shall be the satisfactory maintenance of the Contractor's Record Documents, as determined by the Engineer. The Contractor prepared progress payment estimates shall include an initial block for Contractor Representative and Owner's Representative to acknowledge the satisfactory maintenance of the documents.

3.02 SUBMITTALS

The list of submittal for this project is as shown on table but not limited to:

EXAMPLE LIST OF SUBMITTALS

01310	Construction Schedules
01320	Schedule of Values
01610	Seismic Anchorage Calculations
02270	(Storm)water Quality Control Plan
02513	Asphalt Concrete Paving
02601	Manholes and Cleanouts
02621	Filter Fabric
03071	Epoxies
03100	Concrete
03480	Precast Utility Vaults and Catch Basins
10400	Identifying Devices
15010	General Process and On-Site Utility Piping Provisions
15062	Ductile Iron Pipe
15071	Plastic Pipe
15080	Piping Accessories and Appurtenances

END OF SECTION

SECTION 01310

CONSTRUCTION SCHEDULE

PART 1: GENERAL

1.01 DESCRIPTION

This section specifies the procedures for preparing and revising the cost-loaded critical path construction schedule used for planning and managing construction activities. The schedule provides a basis for determining the progress status of the project relative to the completion time, specific dates, and for determining the acceptability of the Contractor's progress payment estimates. No progress payments will be made until the Engineer and Owner's Representative have accepted the Contractor's construction schedule and schedule of values.

PART 2: MATERIALS

Not Used.

PART 3: EXECUTION

3.01 DESCRIPTION

- A. The Contractor shall illustrate the overall planning and scheduling of project activities using a Gantt chart. The schedule shall depict all significant construction activities and all items of work listed in the breakdown of contract prices submitted by the Contractor in accordance with Submittals, Section 01300-1.10, and Section 01320, Schedule of Values. Completion time and all specific dates given in Special Provisions shall be shown on the schedule. Activities making up the critical path shall be identified. No activity on the schedule shall have a duration longer than 30 days or assigned value greater than \$200,000, except activities comprising only fabrication and delivery may extend for more than 21 days. Activities which exceed these limits shall be divided into more detailed components. The scheduled duration of each activity shall be based on the work being performed during the normal 40-hour work week with allowances made for legal holidays and normal weather conditions.
- B. In addition to the overall schedule, the Contractor shall provide a three-week bar chart schedule to be provided weekly after acceptance of the overall schedule. The three-week bar chart schedule shall be provided weekly for review the day prior to the normal weekly construction meeting. The format shall be one week of history and two weeks of look ahead. It shall be on a work crew level but with schedule activity numbers clearly indicated. It shall be directly produced from the approved project CPM schedule database, not independently from some other data.

3.02 SUBMITTAL PROCEDURES

- A. The Contractor shall provide a schedule of the first 60 calendar days of the project at the preconstruction meeting as a condition to receiving the notice to proceed. This 60-day schedule shall be prepared on reproducible paper and may be in draft form with legible freehand line and lettering.

- B. Within 20 days after the date of the Notice to Proceed, the Contractor shall complete a construction schedule conforming to paragraph 3.01 and representing in detail all planned procurement and on-site construction activities. Upon completion of the schedule, the Contractor shall submit the original and two copies to the Engineer in accordance with Section 01300. The schedule shall be prepared on reproducible paper. A computer diskette of the database clearly labeled and dated, shall be provided to the Construction Manager to facilitate analysis by the Engineer and Owner's Representative.
- C. Within 14 days after receipt of the submittal, the Engineer and the Owner's Representative shall review the submitted schedule and return one copy of the marked up original to the Contractor. If the Engineer finds that the submitted schedule does not comply with specified requirements, the corrective revisions will be noted on the submittal copy returned to the Contractor for corrections and re-submittal as specified in Section 01300. Upon receipt of a schedule and breakdown of contract prices conforming to the contract, the Contractor shall submit the final version of the construction schedule and database to the Engineer in accordance with Section 01300.

Within 14 days after the Engineer has accepted the Contractor's construction schedule and values assigned to the activities of the construction schedule, the Contractor shall provide two copies of computer reports to the Engineer. The reports will be on 8-½ -inch by 11-inch sheets as follows:

1. Tabular listing of activities showing early and late start and finish dates.
 2. Printout network, clearly showing the critical path.
 3. Report on cost and payment status for each activity.
 4. Summary of the costs for each facility
 5. These reports will serve as the basis for the Contractor's progress payment requests. Acceptance of the Contractor's schedule and furnishing reports to the Engineer shall not relieve the Contractor of his responsibility for the adequacy of the schedule and for managing all construction activities including those of subcontractors and suppliers.
- D. After acceptance of the overall construction schedule, the Contractor shall submit the three-week bar chart schedules on a weekly basis.

3.03 SCHEDULE REVISIONS

Revisions to the accepted cost-loaded construction schedule may be made only with written approval of the Engineer and Owner. Changes in timing for activities which are not on the critical path may be modified within the available period of the activities' specific available float but not in a manner which will place them on the critical path, with the written agreement of the Contractor and Engineer. A change affecting the contract value of any activity, the timing of any activity on the critical path, the completion time and specific dates may be made only in accordance with applicable provisions of the Contract Documents.

3.04 PROJECT STATUS UPDATE

Project schedule status and updates electronically shall be provided each month and submitted with the monthly pay request. Monthly progress payments will not be made until the project status reviews have been submitted and accepted by the Engineer. Project status updates shall be submitted to the Engineer in accordance with Section 01300, including a completed submittal review transmittal form.

END OF SECTION

SECTION 01320

SCHEDULE OF VALUES

PART 1: GENERAL

1.01 SUMMARY

This section includes the requirements for the preparation, format, and submittal of Schedule of Values.

1.02 PREPARATION

- A. Prepare Schedule of Values identifying costs of major items of Work and other costs shown in example form at end of this Section.
- B. Consistent with the bid schedule divide the Work into the following major items of Work:
 - 1. Mobilization, Submittals, Bonds & Insurance
 - 2. Demobilization
 - 3. Shoring
 - 4. Foresthill Avenue Sewer Replacement
 - 5. Neighbors Lane Sewer Replacement
 - 6. High Street Manhole Repair
 - 7. Pacific Avenue Manhole Repair and Pipeline Realignment
 - 8. Sacramento Street Sewer Replacement
 - 9. Forest Court Manhole Repair
 - 10. Church Road Sewer Replacement
 - 11. Herrington Drive Sewer Replacement
 - 12. Sacramento Street/Forest Court Sewer Slip-Lining
- C. Assign prices to major items of Work that aggregate the Contract Price. Base prices on costs associated with scheduled activities based on the Project Schedule for each major item of Work.

1.03 SUBMITTALS

- A. Submit preliminary Schedule of Values for all the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the

Work into component parts in sufficient detail to serve as the basis for progress payments during the performance of Work. Such prices shall include an appropriate amount of overhead and profit applicable to each item of Work.

- B. Submit corrected schedule of values within 10 days upon receipt of reviewed Schedule of Values, but no later than 10 days prior to anticipated submittal of first Application for Payment, in accordance with Contract documents, Section D-9.3.
- C. Upon request, support prices with data that will substantiate their correctness.
- D. If activities are added or removed from the Construction Schedule revise the Schedule of Values and resubmit.

PART 2: MATERIALS

Not Used.

END OF SECTION

SECTION 01330

SAFETY PLAN

PART 1: GENERAL

1.01 SUMMARY

Section Includes: Development and maintenance of a Construction Safety Plan.

1.02 REFERENCES

- A. Occupational Safety and Health Standards (OSHA).
- B. California Labor Code, Section 6401.7.
- C. National Fire Protection Association (NFPA):
 - 1. 70E - Standard for Electrical Safety in the Workplace.

1.03 CONSTRUCTION SAFETY PLAN

- A. Detail the Methods and Procedures to comply with California Labor Code Section 6401.7, NFPA 70E, California, Federal, and Local Health and Safety Laws, Rules and Requirements for the duration of the Contract Times. Include the following:
 - 1. Identification of the Certified or Licensed Safety Consultant, who will prepare, initiate, maintain, and supervise safety programs, and procedures.
 - 2. Procedures for providing workers with an awareness of safety and health hazards expected to be encountered in the course of construction.
 - 3. Safety equipment appropriate to the safety and health hazards expected to be encountered during construction. Include warning devices, barricades, safety equipment in public right-of-way and protected areas, and safety equipment used in multi-level structures.
 - 4. Methods for minimizing employees' exposure to safety and health hazards expected during construction.
 - 5. Procedures for reporting safety or health hazards.
 - 6. Procedures to follow to correct a recognized safety and health hazard.
 - 7. Procedures for investigation of accidents, injuries, illnesses and unusual events that have occurred at the construction site.
 - 8. Periodic and scheduled inspections of general work areas and specific work stations.

9. Training for employees and workers at the jobsite.
 10. Methods of communication of safe working conditions, work practices and required personal protection equipment.
- B. Assume responsibility for every aspect of Health and Safety on the jobsite, including the health and safety of Subcontractors, suppliers, and other persons on the jobsite.
1. Forward available information and reports to the Safety Consultant who shall make the necessary recommendations concerning worker health and safety at the jobsite.
 2. Employ additional health and safety measures specified by the Safety Consultant, as necessary, for workers in accordance with OSHA guidelines.
- C. Transmit to OWNER and ENGINEER copies of reports and other documents related to accidents or injuries encountered during construction within ten (10) days of the accident or injury.
- D. CONTRACTOR shall maintain MSDS binder for all materials CONTRACTOR is using on site. CONTRACTOR shall transmit a copy of every MSDS to OWNER before use on site.

PART 2: PRODUCTS

Not Used.

PART 3: EXECUTION

Not Used.

END OF SECTION

SECTION 01340

REQUESTS FOR INFORMATION AND CLARIFICATIONS

PART 1 GENERAL

1.1 DESCRIPTION

- A. Should the Contractor discover conflicts, omissions, or errors in the Contract Documents, or have any questions concerning interpretation or clarification of the Contract Documents, or if it appears to the contractor that work to be done or any matter relative thereto are not sufficiently detailed or explained in the Contract Documents, then, before proceeding with the work affected, the Contractor shall immediately notify the Engineer in writing and request interpretation, clarification, or additional detailed instructions concerning the work. The Contractor shall ask for any clarification or request for information immediately upon discovery, but no less than fifteen (15) days prior to the start date of the activities related to the clarification, based on the latest updated and accepted construction schedule. Contractor shall be responsible for its costs to implement and administer RFI's throughout the Contract duration. Regardless of the number of RFI's submitted, Contractor will not be entitled to additional compensation.
- B. A RFI is not to be used for request for materials /equipment substitutions or value engineering/cost reduction incentive proposals.

1.2 RFI PROCEDURES

- A. Contractor review and submittal:
 - 1. Contractor's review: Before submitting each RFI, the Contractor shall carefully review the following for relevant information:
 - a. All field measurements, quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto.
 - b. All materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work.
 - c. All information relative to means, methods, techniques, sequences, and procedures of construction and safety precautions and programs incident thereto.
 - d. The coordination of each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.
 - e. The Contract Documents.
 - f. The Project correspondence and documentation.

2. Submittal requests

- a. The Contractor shall submit all requests for clarification and/or additional information in writing through the Engineer to the Engineer using a request for information (RFI) form. Contractor shall provide a detailed written statement that indicates the specific Drawings or Specifications in need of clarification and the nature of the clarification requested.
- b. Contractor shall upload an electronic version of each RFI. Each RFI shall be dated and bear a signed certification that Contractor has performed the review defined above. No consideration for review by Engineer of any RFI will be made for any item which has not been certified by the Contractor. All non-certified RFI's will be returned to Contractor without action taken by Engineer, and any delays caused thereby shall be the total responsibility of Contractor.
- c. Each RFI shall be limited to one subject.

B. RFI numbering system: The Engineer will assign blocks of numbers for the Contractor, Engineer, Owner's Representative, and for substitutions. The Contractor will use the block of numbers consecutively with the date of issue, except for re-issuance of a respective RFI in which the subscript A, B, C, etc., will be added until the RFI is resolved. If Contractor believes the RFI reviewer's response is incomplete, Contractor shall issue another RFI (with the same RFI number with the letter "A" indicating if it is a follow-up RFI) to Engineer clarifying original RFI. Additionally, Engineer may return RFI requesting additional information should original RFI be inadequate in describing condition.

C. Owner's RFI review and response time:

1. Except as may otherwise be provided herein, the Engineer will return one copy of each RFI form to Contractor, with its comments noted thereon or on a separate comment sheet, within a reasonable amount of time, but no more than fifteen (15) calendar days following their receipt from Contractor, or if it is necessary to extend this period, the Engineer shall notify the Contractor in writing as to when a decision will be provided.
2. Engineer's review will be only to provide clarification and interpretation of the Contract Documents. Engineer's review shall not relieve Contractor of the responsibility for compliance with the Contract Documents.
3. Engineer's review will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto.
4. The Engineer may furnish additional detailed written instructions to further explain the work, and such instructions shall be a part of the contract documents. Clarifications will be issued using the above RFI system. Should additional detailed instructions in the opinion of the Contractor constitute work in excess of the scope of the contract, the Contractor shall submit notification immediately and written notification thereof to the Engineer no more than seven (7) days following receipt of

such instruction, and in any event prior to the commencement of work thereon. If the Engineer considers it justified, the instructions of the Engineer will be revised or a proposed change order will be issued for the Owner's consideration. The Contractor shall have no claim for additional compensation or extension of the schedule because of any such additional instructions unless the Contractor provides the Engineer written notice thereof within the time frame specified above. In addition, the Contractor shall within fifteen (15) days from the date of notification provide detailed justification and analysis as well as complete pricing and schedule CPM fragmentary network to support any request for time extension.

5. Should the Contractor proceed with the work affected before receipt of a response from the Engineer, any portion of the work which is not done in accordance with the Owner's interpretation, clarifications, instructions, or decisions subject to removal or replacement and the Contractor shall be responsible for all losses.
6. RFI's will not be recognized or accepted, if in the opinion of the Engineer or Engineer, that one of the following conditions exists:
 - a. The Contractor submits an RFI as a submittal.
 - b. The Contractor submits the RFI under the pretense of a contract documents discrepancy or omission without thoroughly reviewing the documents. In this case, the Contractor shall be responsible for both the Engineer's and Engineer's administrative costs to process the RFI. Such costs will be deducted from Contractor's progress payments.
 - c. The Contractor submits the RFI in a manner that suggests that specific portions of the contract documents are assumed to be excluded, or be taken as an isolated portion of the contract documents in part rather than whole.
 - d. The Contractor submits an RFI in an untimely manner without proper coordination and scheduling of work or related trades.
7. The Engineer's review shall not relieve Contractor from the entire responsibility for any variation from the requirements of the Contract Documents unless Contractor has in writing called attention to each such variation at the time of each RFI submittal and Engineer has given written approval of each such variation by specific written notation thereof incorporated in the RFI review; nor will any review by Engineer relieve Contractor from responsibility for compliance with the requirements for careful review above.

PART 2 MATERIALS

Not used.

PART 3 EXECUTION

Not used

END OF SECTION

Section 01354

HAZARDOUS MATERIAL PROCEDURES

PART 1: GENERAL

1.01 SUMMARY

Section includes:

1. Procedures required when encountering hazardous materials at the Work site and
2. Covers the handling and use or disposal of hazardous and potentially hazardous excavated materials.

1.02 REFERENCES

- A. American Conference of Government Industrial Hygienists (ACGHI).
- B. California Health and Safety Code, Section 25117.
- C. American National Standards Institute (ANSI).
- D. State of California Code of Regulations (CCR):
 1. Title 8. Industrial Relations:
 2. Title 22. Social Security:
 - a) Division 4. Environmental Health.
 - b) Division 4.5. Environmental Health Standards for the Management of Hazardous Waste.
- E. National Institute for Occupational Safety and Health (NIOSH).
- F. Occupational Safety and Health Administration (OSHA)
- G. Society for Protective Coatings (SPCC):
 1. Guide 6 - Guide for Containing Debris Generated During Paint Removal Operations.
 2. Guide 7 - Guide for the Disposal of Lead-Contamination Surface Preparation Debris.
- H. United States Environmental Protection Agency (EPA).
- I. United States Code of Federal Regulation (CFR):
 1. Title 29 – Labor:
 - a) 1926.62 – Lead

- b) Part 19, Occupational Safety and Health Standards
 - c) Subpart H, Hazardous Materials
 - d) Section 120, Hazardous Waste Operations and Emergency Response
- 2. Title 40 - Protection of Environment
 - a) 261 - Identification And Listing Of Hazardous Waste

1.03 CERTIFICATION REQUIREMENTS

The CONTRACTOR or the subcontractor responsible for excavation shall be certified by the State of California for hazardous substance removal. The license number of the certified contractor shall be indicated in the bid proposal.

1.04 TRAINING REQUIREMENTS

Personnel responsible for excavation shall be trained in accordance with 29 CFR Part 19, Occupational Safety and Health Standards, Subpart H, Hazardous Materials, Section 120, Hazardous Waste Operations and Emergency Response.

1.05 SUBMITTALS

- A. Submit laboratory reports, hazardous material removal plans, and certifications.
- B. Prior to beginning any excavation, submit the following:
 - 1. Documentation showing that the excavation contractor is trained as required herein.
 - 2. A list of personnel who will be responsible for implementation any Health and Safety Plan, if required, and their roles

1.06 HAZARDOUS MATERIALS PROCEDURES

- A. Hazardous materials are those defined by 40 CFR and California Health and Safety Code, Section 25117.
- B. When hazardous materials have been found that are identified on plans of the Contract documents:
 - 1. Prepare and initiate implementation of plan of action.
 - 2. Notify immediately OWNER, ENGINEER, and other affected persons.
 - 3. Notify such agencies as are required to be notified by Laws and Regulations with the times stipulated by such Laws and Regulations.
 - 4. Designate a Certified Industrial Hygienist to issue pertinent instructions and recommendations for protection of workers and other affected persons' health and safety
 - 5. Identify and contact subcontractors and licensed personnel qualified to undertake storage, removal, transportation, disposal, and other remedial

work required by, and in accordance with, laws and regulations.

- C. When hazardous materials have been found that are not identified on the Contract Documents.
 - 1. Prepare and initiate implementation of plan of action.
 - 2. Notify immediately OWNER, ENGINEER, and other affected persons.
 - 3. Notify such agencies as are required to be notified by Laws and Regulations with the times stipulated by such Laws and Regulations.
 - 4. Designate a Certified Industrial Hygienist to issue pertinent instructions and recommendations for protection of workers and other affected persons' health and safety.
 - 5. Identify and contact subcontractors and licensed personnel qualified to undertake storage, removal, transportation, disposal, and other remedial work required by, and in accordance with, laws and regulations.
- D. Forward to ENGINEER, copies of reports, permits, receipts, and other documentation related to remedial work.
- E. Assume responsibility for worker health and safety, including health and safety of subcontractors and their workers.
 - 1. Instruct workers on recognition and reporting of materials that may be hazardous.
- F. File requests for adjustments to Contract Times and Contract Price due to the finding of Hazardous Materials in the Work site in accordance with Contract Documents.
 - 1. Minimize delays by continuing performance of the Work in areas not affected by hazardous materials operations.

1.07 INDEMNIFICATION

The City of Auburn will indemnify, hold harmless, and defend the Contractor from all suits, actions, damages, or claims resulting from hazardous materials placed by the Contractor within the site of the wastewater treatment plant in accordance with contract requirements. This clause shall protect the Contractor only to the extent that said suits, actions, damages, or claims are based solely on the propriety of retaining said hazardous materials on-site.

1.08 ASBESTOS MATERIALS

- A. It is the specific intent of these Contract Documents to exclude from the Work any and all products or materials containing asbestos. No products containing asbestos shall be incorporated in the Work.

- B. Removal of existing ACM shall be performed by a firm that is registered by Cal-OSHA and certified by the State Contractors Licensing Board and shall be a Licensed Abatement Contractor in the state where the project is located.
- C. Submit 10 copies of plan for the removal, containment, and disposal of ACM.
- D. Submit 6 copies of abatement license of ACM removal contractor
- E. The CONTRACTOR shall be responsible for the proper removal and disposal of asbestos material.
- F. Comply with Placer County Air Pollution Control District.

1.09 PERMITS AND FEES

- A. CONTRACTOR shall be responsible for obtaining and paying for all permits and fees required for completion of the Work.

PART 2: PRODUCTS

Not Used.

PART 3: EXECUTION

3.01 GENERAL

- A. The City shall provide a Soil Engineer to observe excavation work. The Soil Engineer shall classify excavated materials according to the following classifications:
 - 1. Native Nonhazardous: This classification shall apply to soil and rock excavations that are judged by the Soil Engineer to consist of native materials, not subject to possible hazardous materials contamination.
 - a) Not suitable for fill – dispose of at designated site
 - b) Suitable for random fill – stockpile for use
 - c) Suitable for structural backfill – stockpile for use
 - 2. Potentially Hazardous: This classification shall apply to Materials identified by the Soil Engineer. The Soils Engineer may further classify this material by type.
- B. After soil is classified by the Soil Engineer, the Contractor shall handle the soil as specified herein.
- C. All materials used for on-site fill shall be subject to the requirements of Sections 02210, 02221, and 02225, as applicable.

3.02 TESTING OF MATERIALS

- A. The City shall obtain composite samples of the stockpiled material and shall analyze the samples to determine actual levels of contamination and verify that disposal in a Class I landfill without further treatment is acceptable. The Contractor shall be responsible to maintain the stockpile for up to 30 days after the last material is placed in the stockpile, during which time the sampling and analyses shall be completed and results provided to the Contractor.
- B. If the material is determined to be neither hazardous nor a designated waste (as defined by the State of California), the material will be reclassified as Native Nonhazardous material and shall be handled in accordance with the applicable requirements for such material. If the material is determined to be either a hazardous or designated waste, the Contractor shall dispose of the material in a Class I or Class II land fill as determined by the City.
- C. Contractor shall use analytical data provided by the City to prepare all regulatory paperwork for acceptance to the disposal facility, including:
 - 1. Waste profiles,
 - 2. Land Disposal Restriction Notifications, if necessary, and
 - 3. Hazardous Waste Manifests or other shipping papers.
- D. Contractor shall provide copies of all regulatory paperwork to the City.
- E. The Contractor shall load, transport, and dispose all stockpiled Hazardous soil.
 - 1. The Contractor shall use trucks licensed as hazardous waste haulers.
 - 2. The Contractor shall bear all costs involved with this work, including loading, trucking, profile fees, disposal fees, and any county hazardous waste disposal taxes. Contractor shall not be responsible for California State Board of Equalization mandated hazardous waste disposal taxes.

3.03 SEGREGATION OF MATERIALS

- A. The Contractor shall segregate all excavated materials according to the classifications assigned by the Soil Engineer.

3.04 STOCKPILING OF POTENTIALLY HAZARDOUS MATERIALS

- A. Until use or disposal, stockpile in an area where drainage water flows away from the stockpile and protect the stockpile from water infiltration and erosion during wet weather.
- B. Until use or disposal, stockpile on and cover with 10 mil high density polyethylene (HDPE).

- C. Use sand bags or other suitable weights to hold cover in place.

3.05 ALLOWED USES OR DISPOSAL

- A. The Contractor may export suitable Native Nonhazardous materials from the site or use on-site for required fill.

3.06 PAYMENT

- 1. The Agency shall reimburse disposal costs to the contractor, if encountered.

END OF SECTION

Section 01410

REGULATORY REQUIREMENTS

PART 1: GENERAL

1.01 SUMMARY

A. Section includes: Regulatory requirements:

1. Building code.
2. Electrical code.
3. Energy code.
4. Fire code.
5. Mechanical code.
6. Plumbing code.

1.02 REFERENCES

A. National Fire Protection Association (NFPA):

1. NFPA 70: National Electrical Code, 2011.

B. California Code of Regulations (CCR),

1. Title 24: California Building Standards Code.
 - a. California Building Code -2010 (CBC). (Title 24, Part 2.)
 - b. California Electrical Code -2010 (CEC). (Title 24, Part 3.)
 - c. California Mechanical Code -2010 (CMC). (Title 24, Part 4.)
 - d. California Plumbing Code -2010 (CPC). (Title 24, Part 5.)
 - e. California Energy Code -2010 (CEC). (Title 24, Part 6.)
 - f. California Fire Code -2010 (CFC). (Title 24, Part 9.)
 - g. California Green Building Standards Code -2010 (Cal Green). (Title 24, Part 11.)

1.03 SYSTEM DESCRIPTION

- A. Design requirements::
1. Building code:
 - a. California Building Code.
 - b. California Green Building Standards Code.
 2. Electrical code:
 - a. California Building Code.
 3. Energy conservation code:
 - a. California Energy Code
 4. Fire code:
 - a. California Fire Code.
 5. Mechanical codes.
 - a. California Mechanical Code.
 6. Plumbing code:
 - a. California Plumbing Code.

PART 2: PRODUCTS

Not Used.

PART 3: EXECUTION

Not Used.

END OF SECTION

Section 01500

TEMPORARY FACILITIES AND CONTROLS

PART 1: GENERAL

1.01 SUMMARY

A. Section Includes:

1. Furnishing, maintaining, and removing construction facilities and temporary controls, including temporary utilities, construction aids, barriers and enclosures, security, access roads, temporary controls, and removal after construction.

1.02 REFERENCES

B. Occupational Safety and Health Standards (OSHA).

C. California Labor Code, Section 6401.7.

D. National Fire Protection Association (NFPA):

1. 70E - Standard for Electrical Safety in the Workplace.

1.03 SUBMITTALS

A. General: For products specified to be furnished under this Section, submit product data as specified in Section 01300.

B. For temporary piping systems:

1. Submit layout drawings showing proposed routing of piping, including proposed pipe support and pipe restraint locations.
2. Submit product data for piping, fittings, appurtenances, restraints, supports, and all other components of the temporary piping system.

C. For temporary pumping systems:

1. Submit pump data, performance curves, and other operating information as specified in Section 15050.
2. Submit sketches showing layout of temporary pumping system, including pump quantity, configuration in wet well, and proposed piping layout specified in this Section.

3. Methods for minimizing employees' exposure to safety and health hazards expected during construction.
- D. Submit all information at least 28 days prior to when the temporary pumping system is scheduled to be installed and allow 14 days for review and comment by Engineer and Owner.

1.04 TEMPORARY UTILITIES

A. Temporary electrical power:

1. The CONTRACTOR is responsible for making all arrangements with the Owner and paying all costs to provide adequate temporary electrical services except for the following where OWNER may allow for temporary connections if available during certain phases of the work.
2. The Contractor is responsible for providing all breakers, switches, transformers, and cables required to obtain temporary power from these location(s).
3. Provide and maintain adequate jobsite power distribution facilities conforming to applicable Laws and Regulations.
4. Provide, maintain, and pay for electric power for performance of the Work.

B. Temporary electrical lighting:

1. In work areas, provide temporary lighting sufficient to maintain lighting levels during working hours not less than lighting levels required by OSHA and state agency which administers OSHA regulations where Project is located.
2. When available, permanent lighting facilities may be used in lieu of temporary facilities.

C. Temporary heating, cooling, and ventilating:

1. Heat and ventilate work areas to protect the Work from damage by freezing, high temperatures, weather, and to provide safe environment for workers.
2. Permanent heating system may be utilized when sufficiently completed to allow safe operation.

D. Temporary water:

1. Pay for and construct facilities necessary to furnish potable water for human consumption and non-potable water for use during construction. Contractor

is responsible for obtaining a Placer County Water Agency (PCWA) hydrant permit.

2. Remove temporary piping and connections and restore affected portions of the facility to original condition before Substantial Completion.
3. Pay for water used for construction prior to Substantial Completion.

E. Temporary sanitary facilities:

1. Provide suitable and adequate sanitary facilities that are in compliance with applicable Laws and Regulations.
2. At completion of the Work, remove sanitary facilities and leave site in neat and sanitary condition.

F. Temporary fire protection: Provide sufficient number of fire extinguishers of type and capacity required to protect the Work and ancillary facilities.

G. First aid: Post first aid facilities and information posters conforming to requirements of OSHA and other applicable Laws and Regulations in readily accessible locations.

H. Utilities in existing facilities: As specified in Section 01020.

1.05 CONSTRUCTION AIDS

A. Provide railings, kick plates, enclosures, safety devices, and controls required by Laws and Regulations and as required for adequate protection of life and property.

B. Use construction hoists, elevators, scaffolds, stages, shoring, and similar temporary facilities of ample size and capacity to adequately support and move loads.

C. Design temporary supports with adequate safety factor to assure adequate load bearing capability:

1. When requested, submit design calculations by professional registered engineer prior to application of loads.
2. Submitted design calculations are for information and record purposes only.

D. Accident prevention:

1. Exercise precautions throughout construction for protection of persons and property
2. Observe safety provisions of applicable Laws and Regulations.

3. Guard machinery and equipment, and eliminate other hazards.
 4. Make reports required by authorities having jurisdiction, and permit safety inspections of the Work.
 5. Before commencing construction work, take necessary action to comply with provisions for safety and accident prevention.
- E. Barricades:
1. Place barriers at ends of excavations and along excavations to warn pedestrian and vehicular traffic of excavations.
 2. Provide barriers with flashing lights after dark.
 3. Keep barriers in place until excavations are entirely backfilled and compacted.
 4. Barricade excavations to prevent persons from entering excavated areas in streets, roadways, parking lots, treatment plants, or other public or private areas.
- F. Warning devices and barricades: Adequately identify and guard hazardous areas and conditions by visual warning devices and, where necessary, physical barriers:
1. Devices shall conform to minimum requirements of OSHA and State agency which administers OSHA regulations where Project is located..
- G. Hazards in public right-of-way:
1. Mark at reasonable intervals, trenches, and other continuous excavations in public right-of-way, running parallel to general flow of traffic, with traffic cones, barricades, or other suitable visual markers during daylight hours:
 - a. During hours of darkness, provide markers with torches, flashers, or other adequate lights.
 2. At intersections or for pits and similar excavations, where traffic may reasonably be expected to approach head on, protect excavations by continuous barricades:
 - a. During hours of darkness, provide warning lights at close intervals.
- H. Hazards in protected areas: Mark or guard excavations in areas from which public is excluded, in manner appropriate for hazard.
- I. Above grade protection: On multi-level structures, provide safety protection that

meets requirements of OSHA and State agency which administers OSHA regulations where Project is located.

- J. Protect existing structures, trees, shrubs, and other items to be preserved on Project site from injury, damage, or destruction by vehicles, equipment, worker or other agents with substantial barricades or other devices commensurate with hazards.
- K. Fences:
 - 1. Protect temporary and permanent openings and close openings in existing fences to prevent intrusion by unauthorized persons.
 - a. Bear responsibility for protection of plant and material on site of the Work when openings in existing fences are not closed.
 - 2. During night hours, weekends, holidays, and other times when no work is performed at site, provide temporary closures or enlist services of security guards to protect temporary openings.
 - 3. Fence temporary openings when openings are no longer necessary.

1.06 SECURITY

- A. Make adequate provision for protection of the work area against fire, theft, and vandalism, and for protection of public against exposure to injury.

1.07 TEMPORARY CONTROLS

- A. Dust control:
 - 1. Prevent dust nuisance caused by operations, unpaved roads, excavation, backfilling, demolition, or other activities.
 - 2. Control dust by sprinkling with water, use of dust palliatives, modification of operations, or other means acceptable to agencies having jurisdiction.
- B. Noise control:
 - 1. In inhabited areas, particularly residential, perform operations in manner to minimize noise.
 - 2. In residential areas, take special measures to suppress noise during night hours.
- C. Mud control
 - 1. Prevent mud nuisance caused by construction operations, unpaved roads

excavation, backfilling, demolition, or other activities.

1.08 REMOVAL

- A. Remove temporary buildings and furnishings before inspection for Substantial Completion or when directed.
- B. Clean and repair damage caused by installation or use of temporary facilities.
- C. Clean and repair damage caused by installation or use of temporary facilities match surrounding conditions.
- D. Restore existing facilities used during construction to specified or original condition.

1.09 TEMPORARY PROCESS PIPING

- A. Contractor shall provide all piping, appurtenances, and other materials as required to provide temporary piping systems as specified in this Section, as indicated on the Drawings, and as needed to perform the Work.
- B. Contractor shall field route piping as needed and as field conditions dictate, unless otherwise indicated on the Drawings, and determine appropriate lengths of piping and quantity/type of pipe fittings needed to construct temporary piping system. Do not block access points such as stairs, doors, and walkways to existing facilities unless approved in writing by the Owner.
- C. Restrain piping at valves and at fittings where piping changes direction, changes sizes, and at ends:
 - 1. When piping is buried, use concrete thrust block or mechanical restraints.
 - 2. When piping is exposed or under water, use mechanical or structural restraints.
 - 3. Determine thrust forces by multiplying the nominal cross sectional area of the piping by the operating pressure of the piping.
- D. Temporary piping systems shall be installed in a manner that will not damage existing or new facilities.
- E. Unless indicated otherwise, piping material, including gaskets, shall be suitable for the process fluid requiring temporary piping.
- F. After temporary piping system is no longer required:
 - 1. Remove temporary piping system.

2. Clean and repair damage caused by installation or use of temporary piping system.
3. Restore existing facilities to original condition.

1.10 TEMPORARY PROCESS PUMPING

- A. Contractor shall provide temporary pumping system, appurtenances, and other materials as required to provide temporary piping systems as specified in this Section, as indicated on the Drawings, and as needed to perform the Work:
 1. Anticipated pressure will vary based on head losses developed and the final length of installed temporary piping. Contractor shall calculate head losses and provide pump with sufficient pressure to meet flow requirements. Calculations shall be sealed and signed by a professional engineer registered in the state in which the Project is located.
 2. Pump shall be capable of passing a solid with a sphere size of 3 inches.
 3. Temporary pumps shall be capable of matching sewer flow rates, approximately 200 gallons per minute, using variable flow rate pumping. The use of cycled pumping (i.e., on/off) is not acceptable. Provide all wiring and controls necessary to match plant flow rate based on 4 to 20 milliamperes signal available at the Operations Building.
 4. Provide and pay for all power required to operate temporary pumps.
 5. All electrical and instrumentation components will comply with applicable code requirements for the area where the temporary pump is located.
 6. Temporary pumping will be required 24 hours per day during the time period when pumping is required and is critical to the proper operation of the Owner's treatment facility. Provide 24-hour on-site supervision of pumps to ensure that pumps are always operational and performing as required. Notify the Owner immediately if temporary pumping cannot be provided.
 7. Contractor shall be responsible for repairing any damage or reimbursing the Owner for any regulatory fines or additional plant staff time resulting from the Contractor's failure to maintain temporary pumping.
 8. Provide 100 percent backup (a.k.a., standby, redundant, etc.) pumping capacity equal to the required process flow rate. Backup system shall be capable of providing required pumping capacity immediately upon failure of primary pumping system.
 9. All necessary spare equipment and appurtenances shall be available on-site

to allow immediate repair and/or replacement of any pumping system component that is not functioning properly.

- B. Providing temporary piping systems as specified in this Section.
- C. Temporary pumping of other process flows is not allowed unless approved in writing by the Owner.
- D. Restore existing facilities to original condition.
 - 1. Remove temporary process pumping system.
 - 2. Clean and repair damage caused by installation or use of temporary process pumping system.
 - 3. Restore existing facilities to original condition.

PART 2: PRODUCTS

Not Used.

PART 3: EXECUTION

Not Used.

END OF SECTION

SECTION 01510

SANITARY SEWER MAIN TELEVISION AND INSPECTION (CCTV)

PART 1 — GENERAL

1.01 SECTION INCLUDES

This section includes guidelines and requirements for CCTV Inspection. CCTV inspection identifies structural defects, maintenance concerns, and actual and potential sources of I/I in mainline sewers, service laterals, and manholes. CCTV inspection will also be used to verify installed assessment, cleaning, rehabilitation and/or replacement work as required.

1.02 REFERENCES

- A. Codes, Specifications, and Standards - NASSCO – National Association of Sewer Service Companies – Pipeline Assessment Certification Program (PACP) Reference Manual, Version 7.0 or latest version.
- B. Manual for Uniform Traffic Control Devices (MUTCD) standards
- C. Attachment A – PACP Standard Exchange Database Anticipated Inspection Header Form Attribute Guidance Table (CCTV) (Reference NASSCO PACP Reference Manual, Version 7.0 for related information.

1.03 RELATED SECTIONS

- A. Section 01520 – Sewer Flow Control
- B. Section 02607 - Manhole Height Adjustment

1.04 DEFINITIONS

- A. Television Inspection: Operation necessary to complete a true-color audio-visual inspection verifying existing internal pipe conditions including pipe materials, pipe grade, connections, cracks, leaking joints, seepage and roots. Contractor shall furnish all labor, materials, equipment, tools, and other incidental services for CCTV.
- B. MPEG: MPEG (pronounced M-peg), which stands for Moving Pictures Experts Group, is the nickname given to a family of International Standards used for coding audio- visual information in a digital compressed format. For the purposes of this specification, MPEG shall be defined as an ISO-MPEG Level 4 standard (MPEG- 4) digital audio-visual coding having a minimum resolution of 500 lines. All video files shall be named using .mpg or .wmv as the file extension.
- C. External Hard Drive: For the purposes of this specification, an external hard drive is a peripheral auxiliary device connected to the computer via a high-speed interface cable. The

interface cable allows the external hard drive to communicate with the computer so the data may be passed back and forth. The Contractor will deliver all inspection standard exchange databases, digital reports and media to the Owner/Program Manager on an external hard drive compatible with the Owner and Program Manager's equipment and software and will provide adequate storage to contain all deliverables as outlined in the Specifications.

- D. Buried Manhole: A manhole where the manhole cover (lid) is not visible at ground surface. Buried manholes usually require removing the material (excluding light dirt and plant material) covering the manhole lid and raising the manhole frame and cover (lid). All buried manholes on the sanitary systems shall be reported for rising following their location discovery by the Contractor (Reference Specification Section 02607). Subsequently, the raised manholes shall be inspected.

1.05 SUBMITTALS

- A. Submittals are to be in color PDF format for printed documents as well as other required formats when applicable for digital transfers.
- B. Submit one example video on external hard drive of previous sewer inspection work that shows operational and structural defects in sewers, complete with audio commentary and inspection log(s).
 - 1. Videos and inspection logs will be reviewed by Program Manager to determine if quality of CCTV image is acceptable, if defects were properly identified, picture clarity, advancement speeds and lighting are acceptable and documented according to industry standards and the Program Manager's requirements.
 - 2. Modify equipment and/or inspection procedures to achieve report material of acceptable quality.
 - 3. Do not commence Work prior to approval of report material quality by the Program Manager. Upon acceptance, report material shall serve as standard for remaining Work.
- C. Records reports shall include a separate report for each pipe segment showing inspection setup data, each defect and locations of laterals, and other coded information. Also, each report shall include photographs of moderate and severe defects. Each report shall also note the labeling number of the corresponding video recording of that pipe segment. The video record of the pipe inspections shall be provided digitally on an approved mass storage device. These records shall include all video information and narrations. The video files shall have a unique name referenced in the PACP inspection database. The file name shall include manhole ID numbers for upstream and then downstream manholes as the start of the file name. It is preferred the direction of the inspection and inspection date be included as well.
- D. Camera specification sheet
- E. References: Contact names and telephone numbers

- F. List of staff and equipment to be used on this Project
- G. Supervisor and field crew leader's contact information including name and mobile telephone numbers
- H. Confined space entry certification indicating staff to be used on this project have been properly trained should confined space entry be required
- I. Training and inspection plan a minimum of 7 days prior to the first inspection
- J. Public notification door hanger based on Program Manager's provided example
- K. Inspection (See Documentation Section for additional information)
 - 1. Initial first day's inspections within 24 hours after first day's work is completed.
- L. Include the following with each weekly submittal:
 - 1. Inspection media (videos and photographs)
 - 2. Quality controlled Inspection database (PACP Standard Exchange Access Database)
 - 3. Inspection reports (PDF – Digital format)
- M. Traffic control plan
- N. Quality control plan

1.06 EXPERIENCE

- A. Supervisor of the field crews performing these functions shall have the proper training and up- to-date NASSCO PACP certification in these types of equipment and monitoring functions and have a minimum of five (5) years' experience in performing such assignments including safe work practices, etc.
- B. Field crew leaders performing these functions shall have the proper training and up to date NASSCO PACP certification in these types of equipment and monitoring functions and have a minimum of two (2) years' experience in performing such assignments including safe working practices, etc.
- C. The Contractor shall provide the Owner with written documentation (certification) indicating the supervisor, field crew leader and all crewmembers responsible for these assignments have the proper training and the requisite experience.
- D. No crew members shall enter confined spaces without the necessary certified training and permit.
- E. A PACP certified technician or supervisor shall control operation of television equipment and encoding of inspection. Should Contractor utilize any personnel to actually document

the inspection results not PACP certified, those inspections shall be refused and re-survey shall be completely at the Contractor's sole expense.

PART 2 - PRODUCTS

2.01 CCTV PERFORMANCE

- A. The Contractor shall furnish the following, but not limited to: the mobile television inspection studio, television camera, sonar, audio-visual digital encoding equipment/software, and other necessary equipment, materials, power, labor, and technicians as needed to perform the television inspection.
- B. The surveying/inspecting equipment will be capable of surveying/inspecting a length of sewer up to at least one-thousand five-hundred (1,500) feet when entry onto the sewer may be obtained at each end and up to one-hundred (100) feet by rodding or up to seven-hundred and fifty (750) feet where a self-propelled unit is used, where entry is possible at one (1) end only. This equipment will be maintained in full working order.
- C. Each survey/inspection unit will contain a means of transporting the CCTV camera and/or sonar equipment in a stable condition through the sewer under survey and/or inspection. Such equipment will ensure the maintained location of the CCTV camera or sonar equipment when used independently on or near to the central axis of a circular shaped sewer when required in the prime position.
- D. Where the CCTV camera and/or sonar head are towed by winch and bond through the sewer, all winches will be stable with either lockable or ratcheted drums. All bonds will be steel or of an equally non-elastic material to ensure the smooth and steady progress of the CCTV camera and/or sonar equipment. All winches will be inherently stable under loaded conditions. The bonds shall be oriented in such a manner as to enable unhindered extension or retraction through the line. All effort shall be made to prevent damage to the pipe during the television inspection. In the case where damage is caused by the Contractor, for any reason, such as would be caused by incorrect deployment of bonds or retrieval of lodged equipment, the cost of repair or remedy shall be borne solely by the Contractor and repaired immediately after notification to the Owner's Representative within 24 hours.
- E. Each unit will carry sufficient numbers of guides and rollers such that, when surveying or inspecting, all bonds are supported away from pipe and manhole structures and all CCTV cables and/or lines used to measure the CCTV camera's head location within the sewer are maintained in a taut manner and set at rightangles where possible, to run through or over the measuring equipment.
- F. Each unit will carry a range of flow control plugs or diaphragms for use in controlling the flow during the survey/inspection. A minimum of one (1) item of each size of plug or diaphragm ranging from the required diameters will be carried. See Sewer Flow Control Specification 01520 for additional details and requirements.
- G. Television Inspection: The Contractor shall inspect pipelines with pan and tilt conventional

television imagery and/or sonar as indicated in the contract documents so as to record all relevant features and defects of the pipeline under inspection. Inspection of pipelines shall be carried out utilizing the Owner approved formats only.

H. External Hard Drive (Videos):

1. Audio portion of videos shall be sufficiently free from electrical interference and background noise to provide complete intelligibility of oral report.
2. Store in upright position with temperature range of 45 to 80 degrees F (7 to 27 degrees C).
3. Identify each hard drive with labels showing Owner's name, Contractor's name, the inspection period, and project area or sewer segments on the hard drive.

I. Hard Drive Titling:

Each segment shown on the external hard drive should have its own video titled with the beginning and end point of the pipe segment.

J. CCTV Camera Head Prime Position:

The CCTV camera head will be positioned to reduce the risk of picture distortion. In circular sewers the CCTV camera lens and/or sonar head will be positioned centrally (i.e. in prime position) within the sewer. In non-circular sewers, picture orientation will be taken at mid-height, unless otherwise agreed, and centered horizontally. In all instances the camera lens head will be positioned looking along the axis of the sewer when in prime position. A positioning tolerance of $\pm 10\%$ of the vertical sewer dimension will be allowed when the camera is in prime position.

K. CCTV Camera Head Speed:

The speed of the CCTV camera in the sewer will be limited to six (6) inches per second or 30 ft/min for surveys. Similar or slightly higher speed may be used on a case-by-case basis. Stop for a minimum of five (5) seconds at every lateral, defect, or adversity. The speed of scanning sonar will be limited to four (4) inches per second.

L. CCTV Color Camera:

The television camera used for the pipe line inspection shall be one specifically designed for hazardous and corrosive environments and constructed for pipeline inspection. Lighting for the camera shall be suitable to allow a clear picture of the entire periphery of the pipe. The camera shall adhere to the following requirements:

1. Waterproof and shall be operative in 100% humidity conditions with lens fogging and any conditions that may be encountered in the inspection environment.
2. Self-leveling, color pan and tilt camera(s) to facilitate the survey and inspection of all laterals, including defects such as hydrogen sulfide corrosion in the soffit of sewers and benching or walls of manholes over and above the standard defects that require

reporting.

3. A three-hundred sixty (360) degrees rotational scan indicating general condition must be implemented at every fifty (50) feet interval (min.) along sewers, and at manholes and any salient, specified, defect features.
4. The tilt arc must not be less than two-hundred seventy (270) degrees with adjustable supports designed for operation in connection with pipe inspection with a viewing angle of not less than 65 degrees.
5. The view seen by the television camera shall be transmitted to a monitor of not less than 11 inches in size.
6. The travel speed of the television inspection camera (through the pipe) shall be uniform and shall not exceed the maximum speed herein specified.
7. The camera, television monitor, and other components of the video system shall be capable of producing picture quality to the satisfaction of the Program Manager; and if unsatisfactory, equipment shall be removed and no payment will be made for an unsatisfactory inspection.
8. The adjustment of focus and iris will allow optimum picture quality to be achieved and will be remotely operated.
9. The adjustment of focus and iris will provide a minimum focal range from six (6) inches in front of the camera's lens to infinity.
10. The distance along the sewer in focus from the initial point of observation will be a minimum of twice the vertical height of the sewer.
11. The illumination must be mounted on and turned in the direction of the camera such as to allow an even distribution of the light around the sewer perimeter without the loss of contrast picture, flare out, or shadowing, light sensitivity to be greater than 1.5 lux minimum, minimize reflective glare, remote variable intensity control, provide a clear in-focus picture of entire inside periphery of pipe and the ability to achieve proper balance of tint and brightness.

M. Color CCTV :

All CCTV and/or sonar work will use color CCTV reproduction. CCTV Side Scanning Camera:

The Owner's Representative will consider high resolution digital CCTC side scanning cameras if proposed by the Contractor. The Program Manager may not accept the side scanning camera use for this project if the contractor cannot provide supporting documents showing previous successful application.

- N. The survey/inspection vehicle for general public streets or assessable locations will comprise two (2) distinct separate areas. One (1) of these, designated as the viewing area, will be insulated against noise and extremes in temperature, include the provision for air conditioning, and will be provided with means of controlling external and internal sources

of light in a manner capable of ensuring that the monitor screen display is in accordance with the requirements of this specification. Seating/and or space accommodations will be available to enable additional workers to clearly view the on-site monitor, which will display the survey/inspection as it proceeds.

- O. The working area will be reserved for equipment, both operational and stored, and no equipment utilized within the sewer will be allowed to be stored in the viewing area.
- P. The vehicle will be suitable for carrying the survey team and laborers and the equipment necessary to safely perform the work.
- Q. Off road inspection equipment/easement machine proposed by the Contractor shall be reviewed and approved by the Program Manager before the Contractor utilizes said equipment.

PART 3 - GENERAL

3.01 EXECUTION

- A. The following guidelines concerning the use of CCTV will be followed:
 - 1. Generally, CCTV alone will be used for internal condition assessment where the depth of flow is less than twenty-five (25%) percent of overall sewer volume at the start of the survey. If the flow volume is greater than 25%, as agreed upon by the City representative, bypass pumping may be required and paid for according to Section 01520
- B. Confined Space Entry: Crews shall minimize the physical entry into manholes. Manhole entry shall be performed in accordance with Federal, State, Local and any other regulations for confined space entry. Only trained crews and staff may perform confined space entry after obtaining an entry permit. Staff must use safety required equipment, including harnesses, ventilation equipment, etc.
- C. Traffic Control: The work area shall be protected at all times with an adequate number of cones, barricades, flags, certified flaggers, and other measures necessary to meet the Manual for Uniform Traffic Control Devices (MUTCD) standards and to properly and safely protect both vehicular and pedestrian traffic. Flagmen shall work to secure all affected streets. Further requirement for traffic control may be imposed by the specific agency having jurisdiction. All traffic control measures shall comply with the requirements of MUTCD, Part 6 – Temporary Traffic Control, Latest Edition as published by USDOT/FHWA.
- D. Site Security: Wear all required safety equipment, such as safety vests, hardhats, safety glasses, and steel toe boots. Follow all applicable state and local traffic safety procedures. Alert the closest fire department/Emergency Medical Services (EMS) as to the location of the day's work and to stand by for emergencies.
- E. Scheduling Time: Crews shall begin inspections after 8:00 am and terminate inspections no later than 5:00 pm each day unless otherwise directed by the Program Manager in order to

address localized special requirements. Authorization should be obtained if work is to be performed outside of the designated hours. Work should be performed by the Contractor in time frames complying with the City's noise ordinance.

- F. Permits for Rights of Ways & Contract Utility Licensing: The Contractor shall obtain work permits for all work to be performed in State, County and/or City Right of Ways. The Contractor shall also plan for all other insurances, traffic control measures, and other terms of the permit in advance. The Contractor shall also obtain all necessary and applicable licensing.
- G. Sequence of Work:
 - 1. Perform Work in the following sequence:
 - a. Clean sewer lines and manholes in accordance with "Light Cleaning" requirements of Section 02956, Sanitary Sewer Cleaning.
 - b. Contractor shall remove debris as necessary
 - c. After cleaning, the manhole sections shall be visually inspected by means of CCTV. The inspection then will be done one linear section at a time and the flow in the section being inspected will be suitably controlled as specified (see Sewer Flow Control Specification Section 01520). All CCTV inspections shall be performed in accordance with PACP standards including the specific date and time of inspection.
- H. Inspection equipment shall utilize software capable of providing complete survey reports, inspection standard exchange database, and linked media files; equipped with modules necessary for NASSCO Pipeline Assessment and Certification Program inspection.
- I. If television inspection of an entire manhole to manhole sewer segment cannot be successfully performed from one manhole, a reverse setup shall be performed to obtain a complete inspection. A reverse setup shall be considered incidental to and included in the segment's unit price bid for CCTV inspection. If upstream (reverse) setup, is required, establish new inspection run separate from downstream (normal) setup so two inspection records exist in the software, one with the normal setup and one with the reverse setup.
- J. Televised pipe segment inspection is represented by one manhole-to-manhole pipe segment or other structural access-to-access point; not multiple manhole-to- manhole segments.
- K. Show continuous footage reading and other required information on inspections image. Place on screen where it is clearly visible (if black font, do not place on dark background, if white font, do not place on light background).
- L. Viewing shall be in direction of flow, except while camera is being used in a reverse setup. Inspection shall proceed from upstream to downstream, unless prohibited by obstruction.
- M. Keep camera lens clean and clear. If material or debris obscures image or causes reduced

visibility, clean or replace lens prior to proceeding with recording operation.

- N. Camera lens shall remain above visible water level and may submerge only while passing through clearly identifiable line sags or vertical misalignments. If flow exceeds 25 percent of diameter and the camera lens becomes obscured, pause inspection until flow subsides. If necessary, reschedule CCTV operation. Surcharging and flooding of camera lens is not an excusable condition if it has been artificially created upstream, i.e., placement of flow plugs or freshwater flushing in pipe.
- O. Pan the camera to record the inside of each lateral or connecting pipe and the connection of lateral or connecting pipe to sewer pipeline.
- P. Recordings shall clearly show all defects and observations, and their severity in addition to obvious features, i.e., laterals and joints.
- Q. Immediately report to Program Manager any obstructions restricting flow and causing inspection to be interrupted. Assure the obstruction is documented in the inspection with the appropriate defect code. Document condition with still photographs, and begin a reverse inspection setup or inspections of other pipelines to the satisfaction of the Program Manager.
- R. Televis pipe segments from manhole to manhole on same video in continuous run.
 - 1. Video shall clearly show camera starting and ending at manhole, unless defects do not allow it.
 - 2. Do not perform partial televising on one video and then complete run on another video.
 - 3. If line is partially televised, due to excusable condition, i.e., collapsed line, televised length shall be viewed by the Program Manager.
 - 4. If a portion of the Contractor's inspection is unacceptable to the Owner or Program Manager, the entire pipe segment shall be deemed unacceptable and the Contractor shall re-televis the entire pipe segment at the Contractor's sole expense.
- S. The Owner or Program Manager may, on occasion, accept a physical inspection not adhering to minimum standards if adverse conditions are encountered and re- inspection is not advised.

3.02 CCTV INSPECTION

- A. Data Transfer: Upon completion of CCTV inspection, transfer inspection data to an external hard drive (HD) of sufficient capacity and compatibility with Owner's and Program Manager's equipment and available programs; include code required for proper playback of video file.
- B. Labeling: Provide printed label on outside of HD that indicates the following:
 - 1. Name of owner

2. Project title
3. Date of submittal
4. Inspection company
5. Deliverable number
6. Project assignment area (provided by Program Manager)

C. Media:

1. Video:
 - a. Inspections completed, with a unique filename per manhole to manholepipe segment inspection.
 - b. Continuous digital video recordings of the inspection view as it appears on the television monitor shall be taken. The recording shall also be used as a permanent record of defects.
 - c. The recording shall be MPEG-4. Separate MPEG-4 files shall be created for each pipe. In case of a reverse setup, such inspection shall be stored in a separate inspection record and MPEG file. MPEG files shall be written to External Hard Drive media for delivery to the Program Manager.
 - d. MPEG files shall be named according to the following file specification:

TV_[PIPEID]_[Direction]_[MMDDYYYY]_[Incremental Number].mpg
 - e. The incremental number shall be used if multiple inspections are performed for the same line, such as a reverse inspection setup.
 - f. The Owner, at its sole discretion, reserves the right to refuse any MPEG, on the basis of poor image quality, excessive bit rates, inconsistent frame rates or any other characteristics that may affect usability by the Owner.
 - g. The digital video encoding shall include video information that can be reproduced with a video image equal or very close to the quality of the original picture on the television monitor. The replay of the recorded video information shall be free of electrical interference and shall produce a clear, stable image.
2. Audio:
 - a. Embedded in video file
 - b. Operator will include description of inspection setup, including related information from log form and unusual conditions.
 - c. Operation changes (for example, remove roots and restart inspection at footage

prior to root removal)

- d. Verbal description and location of each defect
- e. Verbal description and location of each service connection

D. Still Photographs:

- 1. Provide color digital photographs showing inspection image whenever observation or defect has a moderate or major severity; looking into a lateral or connection pipe; or unless otherwise instructed by the Owner or Program Manager;
- 2. Each with a unique filename matching the asset ID with a random number;
- 3. Encoded in .JPEG format;
- 4. Minimum 1024 x 768 resolution; and
- 5. Provide label on front of photograph with structure identification number, footage (if not visible on photograph), and defect code (if applicable).

E. Database:

- 1. Include all inspections in a single consolidated PACP Version 6 or newer Access Standard Exchange database. Creating a database per inspection is not acceptable. Each submittal standard exchange database shall be cumulative containing all prior inspections as well as inspections conducted during interim period since previous submittal.
- 2. Prior to the start of the Work, provide PACP standard exchange database of collected data including anticipated inspection header field attribute information. A PACP Inspection Header Guidance Table will be provided upon request.
- 3. File Type: MS Access, .MDB, .ACCDB
- 4. Database Format: PACP Version 6 or newer. NASSCO PACP data will be exported into Standard PACP Standard Exchange database.
- 5. List inspection media names in corresponding asset/inspection/defect information field within database.

F. Linear Measurement:

- 1. The CCTV monitor display will incorporate an automatically updated record in feet and tenths of a foot of the footage of the camera or center point of the transducer, whichever unit is being metered, from the cable calibration point, the pipe diameter (physical measurement by Contractor), and verified pipe material. The relative positions of the two (2) center points will also be noted.
- 2. The Contractor shall use a suitable metering device enabling the cable length to be

accurately measured; this shall be accurate to 0.20 feet. The Contractor shall use the footage readings to identify location of defects to the nearest 0.10 feet. Measurement shall be zeroed after each segment inspected. The Contractor shall calibrate the footage meter on a regular basis and demonstrate that the tolerance is being achieved by tape measurement between manholes on the surface. This taped measurement must be included on a quality control form which will be completed and submitted by the Contractor depicting the level of accuracy achieved.

G. Data Display, Recording and Start of Survey/Inspection:

1. At the start of each sewer length being surveyed or inspected and each reverse set-up, the length of pipeline from zero (0) footage, the entrance to the pipe, up to the cable calibration point will be recorded and reported in order to obtain a full record of the sewer length. Only one (1) survey will be indicated in the final report. All reverse set-ups, blind manholes, and buried manholes will be logged on a separate log. Video digits will be recorded so every recorded feature has a correct tape elapsed time stamp. Each log will make reference to a start and finish manhole unless abandonment took place because of blockage.
2. The footage reading entered on to the data display at the cable calibration point must allow for the distance from the start of the survey/inspection to the cable calibration point such that the footage at the start of the survey is zero (0).
3. In the case of surveying through a manhole where a new header sheet and file must be created, the footage will be set at zero (0) with the camera focused on the outgoing pipe entrance.
4. At the start of each manhole length a data generator will electronically generate and clearly display on the viewing monitor and subsequently on the video recording a record of data in alpha-numeric form containing the following minimum information:
 - a. Automatic update of the camera's footage position in the sewer line from adjusted zero (0)
 - b. Sewer dimensions
 - c. Manhole/pipe asset ID number
 - d. Date of survey
 - e. Road name/location
 - f. Direction of survey
 - g. Time of start of survey
 - h. Sewer use (SS - Sanitary Sewer)

- i. Material of construction of the pipe
 - j. The size and position of the data display will be such as not to interfere with the main subject of the picture.
- 5. Once the survey of the pipeline is under way, the following minimum information will be continually displayed:
 - a. Automatic update of the camera's footage position in the sewer line from adjusted zero (0).
 - b. Manhole or pipe asset ID number.
 - c. Defect/observation code(s) (temporarily display when encountered)
 - d. Date and time
- 6. Before camera enters the pipe, inspection shall provide video of the manhole. Video recording shall begin by facing pipe segment to be televised and then pan/tilt/zoom as necessary to point camera up toward the manhole opening.
- H. Coding: Defect Coding, as well as material, shape, and lining coding, and conventions used will comply with PACP formats and will be compatible with the Owner's GIS.

3.03 MAN ENTRY SURVEY

- A. Photographic Camera Position - General Illustration of Sewer Interior:
 - 1. The hand-held photographic camera or CCTV camera will be positioned to reduce the risk of picture distortion. In circular sewers the camera lens will be positioned centrally looking along the axis of the sewer. In non-circular sewers picture orientation will be taken at mid-height, unless otherwise agreed, and centered horizontally.
 - 2. The hand held photographic camera or CCTV camera will be positioned so the long side of the photograph or CD-ROM frame is horizontal.
- B. Photographic Camera Position - Laterals/Specific Defect: A means of accurately locating the photographic or camera's footage and any recorded lateral or defect, along the sewer will be provided, to an accuracy of $\pm 1\%$ or six (6) inches, whichever is greater.
- C. Photographic Quality: The in-sewer photographic camera or hand held CCTV system and suitable illumination will be capable of providing an accurate, uniform and clear record of the sewer's internal condition.

3.04 DELIVERABLES

- A. Digital PACP Standard Exchange database shall be submitted on external hard drive in duplicate to the Program Manager. The database must contain all the data required by this specification.

- B. Final Television Inspection Reports shall be submitted to the Program Manager in PDF on the same external hard drive referenced above. Corresponding MPEG videos and photos shall also be submitted to the Program Manager as outlined by this specification.

3.05 PUBLIC NOTIFICATION – CCTV INSPECTION

- A. Public notification is critical and compliance with the public notification criteria is a prerequisite for CCTV inspection, especially when conducting inspections on sewers in easements passing through private property. Notification must be provided to all property occupiers/owners likely to be affected including residential, commercial and institutional (schools, hospitals, nursing homes, etc.). At a minimum, the following steps shall be taken:
 - 1. The Contractor shall print and distribute pre-approved advance notice door hangers 72 hours before conducting CCTV inspection. The Contractor shall distribute the door hangers to the property owners (residential, commercial and institutional) in the affected area(s).
 - 2. The advance notice door hangers shall be customized by Public Outreach to suit this project and will be provided to the Contractor for printing prior to project commencement. If CCTV inspection is delayed, the Contractor must re-distribute door hangers.
 - 3. The Contractor is responsible for distributing pre-approved “Right-of-Entry” (ROE) forms and securing signatures from affected property owners on the ROE forms prior to conducting CCTV inspection.
- B. The Contractor shall keep a daily log of the distribution of the door hangers. This shall be maintained and submitted to the Owner and/or Program Manager upon request.
- C. The Contractor shall alert the appropriate Owner and Program Manager personnel of their work locations on a daily basis.
- D. Contractor will provide and place “Right-of-Way” signs in prominent locations where CCTV is planned 24-hours in advance of commencing the inspection. Signs will be a minimum of 24 inches wide by 18 inches high with letters a minimum of 2 inches high. Signs will be supported a minimum of 12 inches above grade by integral metal frames. Wording on the signs shall be similar to the following:

CCTV INSPECTION WILL BE CONDUCTED ON “date” and “time.” Contact “person” with “company” at “phone number” for additional information.

3.06 QUALITY ASSURANCE/QUALITY CONTROL

- A. Data Quality Control Procedure:
 - 1. The Contractor shall perform a Quality Control (QC) check of the televised inspection documentation using the QC database provided by the Program Manager.
 - 2. The Contractor shall correct any data conflict, missing data, or other questionable

entry identified by the conflict, missing data, or other questionable entry identified by the QC reports prior to submitting the CCTV inspection data to the Program Manager.

- B. The Contractor shall establish and perform a QA/QC analysis addressing all video and data recorded before the data is submitted to the Owner/Program Manager. The Program Manager will periodically request the Contractor to review the QC results with the Program Manager.
- C. The data submissions shall undergo the same random review checks for Quality when submitted to the Owner/Program Manager. Should accuracy or qualitative levels fall below those deemed acceptable to the Program Manager, the data submittal will be refused and no payment will be released. Contractor will be required to correct or re-do inspections until the Program Manager is satisfied with the work.

3.07 DOCUMENTATION

- A. The Contractor shall complete work on each asset as described herein. Refer to the Measurement and Payment Section (Section 01025) for documentation required with each pay request.
- B. Measurement Units: All dimensions will be in feet and inches. Sewer measurement will be to the nearest inch.
- C. CCTV and Man-Entry Photographs: Photographs will be taken of all laterals or connecting pipes and moderate or severe pipeline defects. Where a defect is continuous or repeated the photographs will be taken at the beginning of the defect and at not less than ten (10) foot intervals thereafter.
- D. The Contractor shall complete weekly and end of work television/inspection reports as described herein. These reports shall be per the format and defect codes of NASSCO's Pipeline Assessment and Certification Program (PACP). Prior to beginning work, the Contractor shall submit a digital sample of the television inspection report to the Program Manager for approval.

END OF SECTION

SECTION 01520

SEWER FLOW CONTROL

PART 1 — GENERAL

1.01 SECTION INCLUDES

The purpose of this section is to define the various methods of wastewater flow control including plugging/blocking and bypass/diversion pumping. Wastewater flow control shall maintain an efficient and uninterrupted level of service to the sewer system while performing investigative or construction operations.

1.02 RELATED SECTIONS

- A. Section 01300 – Submittals
- B. Section 01510 – Sanitary Sewer Main Television and Sonar Inspection
- C. Section 02500 – Lining Cured-In-Place-Pipe (CIPP)

1.03 REFERENCES

- A. ASTM D1238 - Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer
- B. ASTM D1248 - Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable
- C. ASTM D1505 - Standard Test Method for Density of Plastics by the Density-Gradient Technique
- D. ASTM D1693 - Standard Test Method for Environmental Stress-Cracking of Ethylene Plastics
- E. ASTM D2122 - Standard Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings
- F. ASTM D2657 - Standard Practice for Heat Fusion Joining of Polyolefin Pipe and Fittings
- G. ASTM D2837 - Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials or Pressure Design Basis for Thermoplastic Pipe Products

1.04 SUBMITTALS

- A. Prior to any bypass/diversion pumping activity the Contractor shall submit the complete and detailed bypass pumping plan to the Owner's Representative's for review and approval as required of Section 01300, Submittals.

- B. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction. The Contractor may submit a general bypass/diversion pumping plan to be used when bypassing sewer mains smaller than 12-inch diameter. Once the Contractor has received written approval from the Owner's Representative for the smaller than 12-inch sewer main plan, the Contractor may use the plan without re- submittal. The contractor is completely responsible for the design, installation and operation of an effective bypass system. The Owner's Representative's review is for general conformance only and does not relieve the Contractor of any responsibility.
- C. For bypass plans associated with 12-inch or larger sewer mains, a California certified Professional Engineer must sign and seal the bypass/diversion plan.
- D. The bypass/diversion pumping plan submittal, regardless of pipe size, shall have sufficient detail to show the following at a minimum:
 - 1. Lowest overflow point upstream of the bypass/diversion.
 - 2. Pump stations upstream of the bypass/diversion.
 - 3. Staging area for pumps.
 - 4. Sewer plugging method and types of plugs.
 - 5. Number, size, material, location and method of installation of suction piping and required protection against any potential for vortexing.
 - 6. Number, size, material, location and method of installation of discharge piping.
 - 7. Bypass pump sizes, capacity, number of each size to be onsite and the power requirements, including standby equipment that must also be on site.
 - 8. System curve design calculations detailing the static lift, friction losses, velocity losses and flow velocities.
 - 9. Pump curves with the system curves plotted showing the pump operation range and confirming the pump size, horsepower and impeller required.
 - 10. Standby power generator size and location, if utilized.
 - 11. Noise control and abatement measures.
 - 12. Downstream discharge plan including pipe routing plan and profile views.
 - 13. Sections showing suction and discharge pipe depth, embedment, joint restraints, thrust blocking and backfilling.
 - 14. Method of protecting discharge manholes or structures from erosion and damage.
 - 15. Location and position, in detail, where pipes cross roadways and driveways.
 - 16. Traffic Control Plan, if applicable.

17. The plan should take into account the potential for wet weather with flow calculations adjusted accordingly.
 18. Identification Personnel committed solely to monitoring the bypass system including but not limited to bypass pumps, discharge lines, related pump stations, manhole levels, etc. This monitoring shall be conducted continuously until the bypass system is no longer needed.
- E. The Contractor will provide an emergency response plan for each bypass/diversion pumping. The plan shall address at a minimum, protocol for Owner contact, emergency 24-hour contact names and numbers including responsible contractor personnel and vendor emergency numbers, containment and clean up procedures, backup equipment and materials that will be on site, monitoring responsibility and all other information required by the Owner's Representative. The plan will be followed in the event of failure of the bypass/diversion pumping system.
- F. The Contractor must identify all pump stations and the lowest overflow point upstream of the plugging/block and/or bypass/diversion pumping. The Contractor may be required, at no additional cost to the Owner, to station personnel at upstream pump stations and overflow points.
- G. The Contractor shall notify the Owner's Representative a minimum of 48 hours prior to commencing any plugging/block and/or bypass/diversion pumping.
- H. The Contractor shall complete a daily written record (diary) detailing the work carried out and any small items of Work incidental to the Work. The Contractor shall include in his daily record and reference to the following:
1. Delays: Dense traffic, lack of information, sickness, labor or equipment shortage, etc.
 2. Weather: Conditions (e.g., rain, sunny, windy, etc.).
 3. Equipment: On site including size, model, number (e.g., specialty cleaning, bypass equipment, etc.).
 4. Submittals: To the Owner's Representative's.
 5. Personnel: On site by name, trade, hours on site (e.g., all labor, specialty services, etc.).
 6. Accident: Report (e.g., all injuries, vehicles, etc.).
 7. Incident: Report (e.g., damage to property, property Owner's complaint, etc.).
 8. Major defects encountered: including collapsed pipe, if any, cave-ins, sinkholes, etc.
 9. Visitors: On site.
 10. Disposals: Type and quantity of debris (including liquids).

11. Daily Work: Work attempted and work accomplished.

1.05 EXPERIENCE

- A. The Contractor shall provide the Owner's Representative with written documentation acknowledging the supervisor and field crew leaders responsible for this work have received the proper training, are certified, and have the requisite experience. This documentation will include dates of hands-on experience, employer, description of duties/experience, 24-hour contact name and phone number along with pumping vendor contacts, experience and a written commitment to 24-hour emergency service. Documentation on any person shall not be longer than one (1) page.
- B. Supervisor of the field crews must be properly trained in this function and have a minimum of three (3) years' experience in performing successful gravity sewer bypass/diversion pumping, to include safe working practices for the types of equipment and operation of the equipment used for this contract.
- C. Field crew leaders must be properly trained in the function and have a minimum of two (2) years hands-on experience in performing successful bypass/diversion pumping, to include safe working practices for the types of equipment and operation of the equipment used for this contract.
- D. No crewmembers shall enter confined spaces without the necessary certified training.

1.06 PERSONNEL

- A. The Supervisor must visit the project site daily, checking on their personnel and subcontractors, meeting with the field crew leaders, as well as checking on the status and progress of the project.
- B. A field crew leader must be with their crew when their crew is working. Each field crew leader can only have one crew. Each crew must have its own field crew leader; this includes when the requirements call for 24-hour monitoring.

PART 2 - PRODUCTS

2.01 PIPE FOR FLOW DIVERSION

- A. Ductile Iron Pipe: Ductile iron pipe, as specified in Section 15062.
- B. High Density Polyethylene Pipe (HDPE) is permitted for flow diversion. Polyethylene material shall comply with the requirements for Type III polyethylene, C-5 and P-34 as tabulated in ASTM D-1248 and has the Plastic Pipe Institute recommended designation PE3406. The material shall also have an average specific base resin density of between 0.94 g/cc and 0.955 g/cc (ASTM D-1505). Pipe made from these resins must have a long-term strength (50 years) rating of 1,250 psi or more per hydrostatic design basis categories of ASTM D-2837. The polyethylene resin shall contain antioxidants and be stabilized against ultraviolet degradation to provide protection during processing and subsequent

weather exposure. The polyethylene resin shall have an environmental stress crack resistance condition C, as shown in ASTM D-1693, to be greater than 500 hours, 20% failure. All pipes shall be made from virgin quality material. No rework compound, except when obtained from the manufacturer's own production of the same formulation shall be used. The polyethylene resin shall have an average melt flow index, condition E as shown in ASTM D-1238, not in excess of 0.25 g/10 mm. Pipe shall be homogeneous throughout, and free of visible cracks, holes, foreign material, blisters, or other deleterious faults. Diameters and wall thickness shall be measured in accordance with ASTM D-2122. Pipe joining will be done by thermal butt fusion method in accordance with ASTM D-2657.

- C. Polyvinylchloride (PVC) pipe is permitted for flow diversion. PVC pipe shall be rigid and securely coupled with a minimum number of connections. Glued PVC is not allowed.
- D. Lay flat hose is permitted for use with 2" and 3" gas powered portable pumps, and must be in like new condition free of damage, leaks or other unacceptable conditions. Use of lay flat hoses across roadways is prohibited.
- E. Irrigation type piping is not allowed.
- F. No more than two (2) pump discharge hoses will be allowed at any given time. The length of these hoses shall be limited at the direction of the Owner's Representative or as indicated in the approved by-pass pumping plan. The Contractor, at a minimum, shall design all piping, joints and accessories to withstand twice the maximum operating pressure or 100 psi whichever is greater.
- G. If required, the Contractor must provide air relief (air relief valves, etc.) on bypass/diversion pumping discharge piping to insure proper operation.
- H. All pumps used shall be fully automatic self-priming units and do not require the use of foot-valves or vacuum pumps in the priming system. The pumps may be electric, gas, or diesel powered, provided they meet all specified sound level requirements. If electric pumps are used, the combined generator/pump system shall meet the specified sound level requirements. All pumps used shall be constructed to allow dry running for long periods of time to accommodate the cyclical nature of effluent flows.
- I. Maintain sufficient equipment, materials and personnel on site to monitor the system and ensure continuous and successful operation of bypass and dewatering systems.
 - 1. Keep standby pumps on site, fueled and operational at all times.
 - 2. Maintain sufficient number of valves, tees, elbows, connections, tools, sewer plugs, piping, and all other necessary parts or system hardware on-site to ensure immediate repair or modification of any part of system as necessary.
- J. Unless specified otherwise in these Specifications or approved by the Owner's Representative, all pumps (and generators if used) shall be fully sound attenuated and shall produce a noise level of sixty-five (65) dB or less at a distance of twenty- three (23) feet.
- K. The Contractor shall provide the necessary stop/start controls for each pump.

PART 3 - EXECUTION

3.01 GENERAL STANDARDS AND REQUIREMENTS

- A. Prior to commencing each bypass/diversion pumping activity the Contractor must receive written approval from the Owner's Representative.
- B. Ensure all levels of sewage flow are continuously monitored and effectively handled.
- C. The back-up pump, appropriate piping, fuel, lubrication and spare parts shall be incorporated into the bypass/diversion pumping arrangement at the site, ready for use in case of a breakdown.
- D. At no cost to the Owner, the Contractor will carry out a "trial run" of the bypass/diversion arrangement on all sewers greater than 12-inches. This trial run must be conducted before the Owner's Representative will accept the arrangement. The "trial run" shall demonstrate the incorporation of all standby equipment to handle flows when the main pump set is switched off. The "trial run" shall be performed using *clean* water. Additionally, the Contractor shall perform leakage and pressure tests of the bypass pumping discharge piping using *clean* water prior to the actual operation. The pressure and leakage test shall be conducted at one-and-a-half times the maximum pressure the system will experience based on the approved Bypass Pumping Plan for a period of two hours.
- E. All materials used for bypass/diversion pumping shall be pre-approved by the Owner's Representative prior to commencing pumping activities. Materials later determined to be unacceptable shall be replaced with acceptable materials at no additional cost to the Owner.
- F. When wastewater flows at the upstream manhole of the sewer main being televised are above the maximum allowable requirements for television inspection, or do not allow the proper sewer or manhole repair, the flows shall be reduced to the levels required by one of the following methods: plugging/blocking or bypass/diversion pumping of the flows, as approved by the Owner's Representative.
- G. In some applications, the wastewater flow may be plugged/blocked and contained within the capacity of the collection system. This shall only be done when it has been determined by the Contractor and approved by the Owner's Representative the system can accommodate the surcharging without any adverse impact to the system or customers.
- H. When a sanitary sewer is being rehabilitated or replaced, the Contractor shall provide notification to all Property Owner's forty-eight (48) hours in advance of planned downtime for public and private service laterals connected to or served by the sewer main being rehabilitated or replaced. Downtime for all private or public service laterals is not to exceed six (6) hours.
- I. During construction, flows in sections of the existing sewer being rehabilitated by removal and replacement shall be accommodated by plugging/blocking or bypass/diversion pumping.
- J. The plan must keep the wastewater flowing without discharge or spills into any storm sewers, adjacent creeks or on to the ground. No bypassing to ground surface, receiving waters, storm drains, or bypassing resulting in groundwater contamination or potential health

hazards shall be permitted. The Contractor will seek and obtain inspection and testing approval of each section of newly laid sewer before removing the flow diversion from service and placing the newly installed or rehabilitated section into service.

- K. In sections of the existing sewer being rehabilitated by laying a new line parallel to the existing sewer, the existing sewer may be used to accommodate the existing flow, and no bypass/diversion pumping will be necessary if the existing sewer is not damaged or otherwise unsuitable for effective use or its use restricted by the Contractor's operations.
- L. All pipe materials utilized in wastewater flow control shall be in like new condition, and free of defects, and leaks. The Contractor, at no cost to the Owner, shall replace any defective material. Upon completion of the job, wastewater flow control materials shall be removed from the site.
- M. Before any wastewater flow control equipment is installed, the Contractor shall de-silt the segment of sewer to be bypassed while it is still under flow. Subsequent jetting and final cleaning before inspection or repair shall be undertaken while the segment of sewer is bypassed.
- N. The Contractor is responsible for locating any existing utilities in the area the Contractor selects to locate the bypass pipelines. The Contractor shall locate his bypass pipelines to minimize any disturbances to existing utilities and shall obtain approval of the pipeline locations from the Owner's Representative. All costs associated with relocating utilities and obtaining all approvals shall be paid by the Contractor.
- O. During all wastewater flow control operations, the Contractor shall protect manholes and all local sewer lines from damage inflicted by any equipment. The Contractor shall be responsible for all physical damage to mainlines, manholes, and all local sewer lines caused by human or mechanical failure.
- P. The Contractor shall complete all wastewater flow control activities with the minimum sound level compatible with the herein specified noise levels for temporary pumping systems.

3.02 DEPTH OF FLOW

- A. In performing television inspection (without sonar), joint testing, and/or sealing and other sewer rehabilitation work, the Contractor shall control the depth of flow in the sewer within the following guidelines:

Maximum Pipe Flow Depth

TELEVISION INSPECTION		JOINT TESTING AND SEALING	
Pipe Size	% Pipe Dia.	Pipe Size	% Pipe Dia.
6"-12"	25	6"-12"	20
15"-24"	25	15"-24"	25
27" or larger	25	27" or larger	30

- B. When sewer line flows, as measured in the first manhole upstream of the sewer segment being inspected or rehabilitated, exceed the maximum depth listed above or inspection of

the complete pipe periphery is necessary for effective testing, sealing, or line work, the Contractor shall implement wastewater flow control methods. The implementation of the flow control method shall be reviewed and approved by the Owner's Representative.

3.03 PLUGGING AND BLOCKING

- A. The Contractor shall insert a sewer line plug into the line at a manhole upstream from the section being inspected or repaired. The plug shall be so designed so all or any portion of the flow can be released. Plugs should be secured to manhole to prevent movement downstream. Flows shall be shut off or reduced and continuously monitored to within the maximum flow limits specified. Wastewater flow shall be restored to normal following completion of work.
- B. No Plumbers plugs will be allowed.

3.04 BYPASS/DIVERSION PUMPING

- A. When bypass/diversion pumping is required, a pump size shall be determined by the Contractor. The Contractor shall supply the necessary pumps, conduits, and other equipment to effectively divert the flow of wastewater around the sewer section where the work is to be performed. The bypass system shall have sufficient capacity to handle existing flows plus additional flow potentially occurring during periods of rainstorms as indicated from the flow monitoring program. The Contractor shall be responsible for furnishing the necessary labor and supervision to set up, monitor and operate the pumping and bypassing system. A "setup" consists of the necessary pumps, conduits, and other equipment required to divert the flow of wastewater from the start to finish of work performed.
- B. Wastewater shall be pumped directly into the nearest available downstream manhole, provided the existing sewer has the capacity to transport the flow. The Contractor shall request the Owner's Representative to determine the capacity of the downstream existing system. The Contractor shall request this determination a minimum of fourteen (14) calendar days prior to the planned bypass/diversion pumping.
- C. The Contractor shall be responsible for monitoring and keeping the pumps running continuously 24 hours a day, if required, until the bypass operation is no longer required. The Contractor shall have standby pumps on site along with all necessary supporting materials, accessories, fuel and personnel at all times.
- D. Bypass pumping systems shall have sufficient capacity to pump peak flows and an approximate sewer flow rate of 200 gallons per minute in the pipes being bypassed (flows in the existing interceptor sewers can increase dramatically during periods of wet weather). The Contractor shall provide all pipeline plugs, pumps of adequate size to handle wet weather peak flows, and temporary discharge piping to ensure the total flow of the interceptor sewer is safely diverted around the section to be repaired. Wastewater flow control system will be required to be operated and monitored twenty-four (24) hours per day.
- E. Maintenance personnel capable of starting, stopping, refueling, and maintaining the pumps and equipment during the bypass/diversion pumping operation shall continuously monitor

pumps and equipment. If pumping is required on a 24-hour basis, engines shall be equipped in a manner to keep noise within limits specified herein.

3.05 FLOW CONTROL PRECAUTIONS

- A. Where the wastewater flow is plugged/blocked, the Contractor shall be responsible for taking all necessary precautions to protect public health. The sewer lines shall also be protected from damage. The following shall apply:
 1. No wastewater shall be allowed to back up into any homes or buildings.
 2. No wastewater shall overflow any manholes, cleanouts, or any other outlet.
 3. Customers upstream of the flow control area shall be able to use all their water and sewer utilities without interruption.
 4. If any of the above occur or are expected to occur, the Contractor shall provide bypass pumping or flow diversion to alleviate all of the conditions and perform response as stipulated per the Consent Decree. Additionally, the Contractor shall continuously monitor and observe the conditions upstream of the plug and be prepared to immediately start bypass/diversion pumping, if needed.
- B. Any sump pumps, bypass pumps, trash pumps, or any other type of pump, pulling wastewater or any type of material out of the manhole or sewer, shall discharge the material into another manhole, or appropriate sealed vehicle or container approved by the Owner's Representative. Under no circumstances shall this material be discharged, stored, or deposited on the ground, swale, road, or open environment.
- C. The removal of excavated materials that contain, or are contaminated by sewage, including but not limited to spoil materials, pipe, debris, portions of manholes etc. shall be discharged into appropriate sealed vehicles or containers and not placed on the ground, swale, road, or open environment.
- D. The Contractor shall take appropriate steps to ensure all pumps and piping carrying raw wastewater are protected from traffic. Traffic control shall be performed in accordance with the requirements of the governing agency.
- E. Prior to any wastewater flow control operations, the Contractor will identify the pump station/s and lowest overflow point upstream of the planned plugging/blocking or bypass/diversion. During operations the Contractor will continuously monitor the pump stations and lowest points to ensure overflow does not occur.
- F. In the event, during any form of "Sewer Flow Control," raw wastewater is spilled, discharged, leaked, or otherwise deposited in the open environment, the Contractor shall immediately stop overflow and shall immediately report overflows to the Owner's emergency dispatch center and the Owner's Representative. The Contractor shall be responsible for any containment and cleanup of liquids and solids and stabilization of the area affected. This work shall be performed at the Contractor's expense with no additional cost to the Owner. The Contractor shall also be responsible for notifying the Owner's Representative and complying with any and all regulatory requirements for cleaning up the spill at no additional cost to the Owner. The Contractor shall be responsible for any fines

assessed by regulatory agencies.

- G. During wastewater flow control operations, the Contractor shall take proper precautions to prevent damage to existing sanitary sewer facilities, flooding, or damage to public or private property.
- H. The Contractor shall be responsible for, and make repairs, replacements or rebuilds, as directed by the Owner's Representative, to any portion of the sewer system damaged during any plugging or bypass/diversion pumping operation. All such repairs, replacements, and rebuilding shall be paid for by the Contractor.
- I. The Contractor shall be responsible for, and make such provisions, as are necessary, for handling all flows in existing sewers, connections, and manholes by pipes, flumes, or by other approved methods at all times, when his operations would, in anyway, interfere with normal functioning of those facilities.
- J. The Contractor shall be responsible for the removal of any debris and sedimentation in the existing sewers, laterals, and manholes, etc., attributable to his work under this Contract. The Contractor is responsible for the proper disposal of these items. The debris and liquids are to be disposed of properly in accordance with all applicable laws. The local municipality can furnish a letter to the landfill stating the contractor is authorized to dispose of the non-hazardous materials. Debris and liquids type and quantities are to be tracked in the daily Contractor diary. Hauling and disposal costs will be borne by the Contractor.
- K. It is the Contractor's responsibility to notify in writing any Property Owner and/or resident having a sewer service connection on the sewer being rehabilitated or replaced. The Contractor shall notify Property Owners 48 hours prior to commencing sewer rehabilitation or replacement. The Contractor shall be solely responsible for any damage caused by property service connection backups caused by the sewer rehabilitation operations.

3.06 CLEAN UP

- A. Keep premises free from accumulations of waste materials, rubbish, and other debris resulting from the Work.
- B. Restore to original condition portions of site not designated for alterations by Contract Documents.
- C. When by-pass pumping operations are complete, drain piping into sanitary sewer prior to disassembly.

END OF SECTION

SECTION 01620

QUALITY CONTROL AND INSPECTION

PART 1 GENERAL

1.1 CONTRACTOR'S QUALITY CONTROL

- A. General: The Contractor is to ensure that products, services, workmanship and Site conditions comply with the requirements of the Contract Documents by coordinating, supervising, testing and inspecting its Work. The Contractor shall utilize only suitably qualified, skilled and trained personnel experienced in the tasks required to complete the Work in accordance with the quality requirements of the Contract Documents. Should there be no quality basis specifically prescribed for any portion of the Work, the quality and testing procedures shall be in accordance with the best-accepted practices of the construction industry for the locale of the Project, for projects of this type, or standards set by engineering or technical societies (e.g. ASTM or ASHRAE), whichever is more stringent.
- B. Quality of Work: The Contractor's quality of Work shall include, but not be limited to, the following requirements:
1. Quality of Products: Unless otherwise indicated or specified, all products shall be new, free of defects, and fit for the intended use.
 2. Quality of installation: All Work shall be produced plumb, level, square and true, or true to indicated angle, and with proper alignment and relationship between the various elements, as shown on or required by Contract Documents.
 3. Protection of Completed Work: Take all measures necessary to preserve completed Work free from damage, deterioration, soiling, and staining, until acceptance by Owner.
 4. Standards and Code Compliance and Manufacturer's Instructions and Recommendations: Unless more stringent requirements are indicated or specified, comply with manufacturer's instructions and recommendations, reference standards and building code research report requirements in preparing, fabricating, erecting, installing, applying, connecting, and finishing Work.
 5. Deviations from Standards and Code Compliance and Manufacturer's instructions and Recommendations: Secure Owner's advanced written consent. Document and explain all deviations from reference standards and building code research report requirements and manufacturer's product installation instructions and recommendations, including acknowledgement by the manufacturer that such deviations are acceptable and appropriate for the Project.
 6. Verification of Quality: Work shall be subject to verification of quality by Owner in accordance with provisions of the Contract Documents.

C. Defective Work:

Defective Work shall be modified, replaced, repaired or redone by the Contractor at no change in Contract Sum or Contract Time. Acceptance of Defective Work, without specific written acknowledgement and approval of Owner, shall not relieve the Contractor of the obligation to correct such Work. Should Owner determine that it is not feasible or in Owner's interest to require Defective Work to be repaired or replaced, an equitable reduction in Contract Sum shall be made by agreement between Owner and Contractor. If equitable amount cannot be agreed upon, a Construction Change Directive will be issued and the amount in dispute resolved in accordance with the Contract Documents. Owner and Owner's consultants disclaim any and all responsibility for Work produced not in conformance with the Drawings and Specifications. Contractor shall have full responsibility for all consequences resulting from Defective Work, including without limitation all delays, disruptions, extra inspection and correction costs by Contractor and Owner and re-Work, and extra time and costs of all types. Contractor waives excuses for defective work relating to Owner's prior review of Submittals and/or prior failure to notice Defective Work in place on inspection.

PART 2 MATERIALS

Not used.

PART 3 EXECUTION

3.1 INSPECTION AND TESTING

A. General:

1. Where the Contract Documents require work to be field tested or approved, it shall be tested in the presence of the Construction Manager or its authorized representative. The Construction Manager shall have the right to witness all on-site tests performed by the Contractor and any shop tests. The results of any tests performed by the Contractor shall be made available for the information of the Construction Manager. Inspections, tests or favorable reviews by the Construction Manager or others shall not relieve the Contractor from its obligation to perform the work in accordance with the requirements of the Contract Documents or for its sole responsibility for the quality of workmanship and materials.
2. Except as specifically required under the technical specifications for testing and inspection, all tests for materials furnished by the Contractor will be done in accordance with commonly recognized standards of national organizations. Where tests are to be performed by the Construction Manager or by an independent laboratory or agency, the Contractor shall furnish such samples of all materials as required by the Construction Manager without charge. The sample or samples of materials to be tested shall be selected by such laboratory or agency, or the

Construction Manager, and not by the Contractor. No material for which the Contract Documents require the submittal and approval of tests, certificates of compliance or other documentation shall be incorporated in the Work until such submittal has been made and approved. The Contractor shall provide safe access, including plants where materials or equipment are manufactured or fabricated, for the Construction Manager and inspectors to adequately inspect the quality of work and the conformance with the Contract Documents. The Contractor shall furnish the Construction Manager the necessary labor and facilities for such things as excavation in the compacted fill to the depths required to take samples. The Contractor shall provide adequate lighting, ventilation, ladders and other protective facilities as may be necessary for the safe performance of inspections.

3. Upon completion of the Work the Construction Manager will conduct a final inspection as provided in Section F– Standard Specifications. Records shall be available at all reasonable hours for inspection by other local or State agencies to ascertain compliance with laws and regulations.
4. Neither the employment of independent testing and inspection agency nor observations or tests by Owner and Owner’s consultants shall in any manner relieve the Contractor of obligation to perform Work in full conformance to all requirements of the Contract Documents. The Owner reserves the right to reject all Work not in conformance to the requirements of the Contract Documents, or otherwise Defective.

B. Notice:

1. The Contractor shall notify the Construction Manager in writing at least twenty-four (24) hours before any field testing or special inspections are required to be performed by the Construction Manager or independent laboratory furnished by the Owner. The Contractor shall notify the Construction Manager at least two hours before any inspection is required to be performed or to witness the Contractor’s on-site field testing.
2. Whenever the Contractor varies the period during which work is carried on each day, the Contractor shall give due notice to the Construction Manager so that proper inspection may be provided. Any work done in the absence of the Construction Manager shall be considered to be rejected. It will be the responsibility of the Contractor to demonstrate to the satisfaction the Construction Manager that the work meets all conditions of the specification and if such conditions are not met to remove the work.
3. The Contractor shall give the Construction Manager written notification at least thirty (30) days prior to the shipment of materials and equipment to be tested and/or inspected at the point of origin. Satisfactory tests and inspections at the point of origin shall not be construed as a final acceptance of the materials and equipment nor shall such tests and inspections preclude retesting or reinspection at the site of the Work.

C. Costs of Testing:

1. The Contractor shall be responsible for, and shall pay for, all quality control and off-site tests of materials required including all source and mix design tests for the approval of soil and concrete materials. The Owner will perform the soils and concrete confirmation tests detailed in the Technical Specifications during the performance of the Work. Owner will retain and pay a qualified testing agency to perform soil compaction testing and work identified as requiring special inspections and testing as defined by CBC section 1701. All other testing required by the technical specifications shall be the responsibility of the Contractor.
 2. The Contractor shall be responsible for, and shall pay for, all source quality control and all on-site tests of materials required, except those tests specifically noted to be performed and paid for by the Owner.
 3. The Construction Manager shall have the authority to require additional tests or inspections due to the manner in which the Contractor executes its work. Examples of such additional tests and inspections include; tests of materials substituted for previously accepted materials, or substituted for specified materials, or retests made necessary by failure of material to comply with the requirements of the Specifications. Where such tests and inspections are required by Contract to be performed by the Owner, the Owner will pay for the additional tests and inspections but will issue an unilateral Change Order to deduct these costs from the Contract price.
- D. Work Covered Prior to Inspection and/or Testing: Work requiring inspection and/or testing shall not be concealed or buried prior to the acceptance of such inspection or testing. Work covered without the favorable review or consent of the Construction Manager shall, if required by the Construction Manager, be uncovered for inspection and/or testing at the Contractor's expense.
- E. Work Covered With Prior Inspection and/or Testing: If the Construction Manager considers it necessary or advisable that covered work which was favorably inspected and tested be uncovered for re-inspection and/or retesting, the Contractor, at the Construction Manager's request, will uncover, expose or otherwise make available for observation, inspection or testing as the Construction Manager may require, that portion of the work in question, furnishing all necessary labor, materials, tools, and equipment. If it is found that such work is defective, the Contractor will bear all expenses of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction. If, however, such work is not found to be defective the Contractor will be allowed an increase in the Contract price or an extension of the Contract time, or both, directly attributable to such uncovering, exposure, observation, testing and reconstruction, and a Change Order shall be issued for such additional work.
- F. Coordination of County, City Building and Other Inspections: The Contractor is completely responsible for scheduling all County, City and any other agency inspections in accordance with the County, City and agency requirements. The Contractor shall notify the Construction Manager of all building and other work component inspection notices and schedules. Failure of the Contractor to properly coordinate and schedule these inspections shall not be cause for time extensions.

- G. Special Tests and Inspections: As provided for in the Contract Documents, laws and regulations, specialized tests and inspections shall be performed by special inspectors certified by the International Code Council (ICC). Unless otherwise stated in the Contract Documents, each of these tests will be performed and paid for by the Owner.
- H. Inspections and Tests by Serving Utilities: Unless otherwise indicated in the Contract Documents, the Contractor shall cause, schedule and conduct inspections and tests by serving Utilities required for the Work under this Contract.
- I. Inspections and Tests by Serving Manufacturers: Unless otherwise indicated in the Contract Documents, the Contractor shall cause all required tests and inspections to be conducted by materials, equipment or systems manufacturers. Additionally, all tests and inspections required by materials, equipment or systems manufacturers as conditions of warranty or certification of Work shall be made, the cost of which shall be included in the Contractor's bid.

END OF SECTION

SECTION 01666

TESTING OF GRAVITY SEWER LINES AND MANHOLES

PART 1: GENERAL

1.01 DESCRIPTION

- A. The work of this section consists of testing gravity sewer lines and gravity sewer manholes. Repaired work shall be retested.
- B. Testing Methods:
 - 1. Gravity sewer lines - air test
 - 2. Manholes – Vacuum test to be used for manholes. Vacuum test to conform to ASTM C1244.

1.02 QUALITY ASSURANCE

- A. Flow meters shall record the actual volume plus or minus 2 percent.
- B. Air test gauges shall be ANSI/ANSI B40.1, Grade 3A (plus or minus 0.25 percent of full scale accuracy), 15 psi dial range.
- C. Water test gauges shall be ANSI/ANSI B40.1, Grade 2A (plus or minus 0.5 percent of full scale accuracy), dial range approximately twice the required test pressure.

1.03 SUBMITTALS: In accordance with Section 01300.

- A. Accuracy certification by approved independent testing labs for flow meters and test gauges. Certifications shall be dated no more than 90 days prior to actual system testing.
- B. Prior to testing, provide the following information:
 - 1. All Tests: Describe precautions that will be taken to protect system equipment that might be damaged under test pressures, and the proposed method for rerouting sewer flows where the system must remain in service.
 - 2. Air Test: Describe safety devices on air test equipment and personnel safety precautions during air test.

1.04 PROJECT CONDITIONS

Testing shall not be performed until each system has been flushed or thoroughly cleaned in accordance with procedures in the section that describes sewer line installation.

PART 2: MATERIALS

Not Used.

PART 3: EXECUTION**3.01 GENERAL**

Prepare each section for testing, using adequate bracing; protect system equipment susceptible to damage by test pressures; make provision for installation of Agency's pressure gauge in parallel with Contractor's gauge, if so requested; and maintain services where required.

3.02 GRAVITY SEWER SYSTEMS

- A. Air Test: Test lines less than or equal to 30 inches in diameter between manholes with low pressure air. Safety requires regulator or relief valve on pressurizing equipment, set at 8 psig. No one will be allowed in manholes while there is air pressure against test plugs.

Lines greater than 30-inches in diameter shall include individual joint testing as specified.

- B. Plug all pipe outlets to resist test pressure. Give special attention to laterals. Plug all other pipes in both upstream and downstream manholes.
- C. Supply air into the line until the test pressure of 3.5 psi in excess of the ground water pressure is attained or 8 psi, whichever is greater. Allow at least 5 minutes for air temperature in the test section to stabilize.
- D. Re-establish the test pressure, and start a stop watch. Determine the time required for pressure to drop 1.0 psig.
- E. For 6-inch and smaller pipe only, if the pressure does not drop during the stabilization period, and no additional air has been added, the section undergoing test will have passed without further testing.
- F. The pipe section will also have passed if the time observed for the pressure to drop 1.0 psig is greater than that determined by using Table 1.

Determine the test time from Table 1 (minimum time 60 seconds).

Table 1 – Minimum Test Time for Various Pipe Sizes

SIZE	Time per 100-feet	SIZE	Time per 100-feet	SIZE	Time per 100-feet
4-inch	0.3-min.	12-inch	1.8-min.	24-inch	3.6-min
6-inch	0.7-min.	15-inch	2.1-min.	27-inch	4.2-min.
8-inch	1.2-min.	18-inch	2.4-min.	30-inch	4.8-min.
10-inch	1.5-min.	21-inch	3.0-min.		

G. When a combination of more than one pipe size is under test, the calculated time for the larger pipe shall apply.

H. For larger sewer pipes, refer to the material specification for testing requirements.

3.03 VISUAL TEST FOR PIPELINES

Interior visual inspection shall be conducted by the Owner and/or CCTV inspection may be performed by the Owner. The Owner's Inspector shall visibly inspect the line and record findings. Preliminary inspections may be performed by outside contractors, but shall not be accepted by Engineer as an official record.

The sewer system shall be completely cleaned by an approved method prior to visual inspection. The sewer system shall be rejected if any of these conditions exist:

- A. Standing water or sags greater than ½-inch in depth.
- B. Standing water in services.
- C. Offset joints.
- D. Cracked pipe.
- E. Infiltration.

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1: GENERAL

1.01 CLOSEOUT TIMETABLE

The Contractor shall establish dates for equipment testing, interim final inspections, and on-site instructional periods (as required under the Contract). These dates shall take into account the interim completion dates noted in the Agreement. Such dates shall be established not less than five working days prior to beginning any of the foregoing items, to allow the Owner, the Engineer, and their authorized representatives sufficient time to schedule attendance at such activities. The testing requirements of Section 01010, Paragraph 3.09; Tests and Inspection, shall be adhered to.

1.02 FINAL CLEANUP

The Contractor shall promptly remove from the vicinity of the completed work, all rubbish, unused materials, concrete forms, construction equipment, and temporary structures and facilities used during construction. Final acceptance of the work by the Owner will be withheld until the Contractor has satisfactorily complied with the foregoing requirements for final cleanup of the project site.

1.03 MAINTENANCE AND GUARANTEE

- A. The Contractor shall comply with the maintenance and guarantee requirements contained in the General Conditions and Supplementary Conditions.
- B. Replacement of earth fill or backfill, where it has settled below the required finish elevations, shall be considered required repair work, and any repair or resurfacing constructed by the Contractor which becomes necessary by reason of such settlement shall likewise be considered required repair work.
- C. The Contractor shall make all repairs and replacements promptly upon receipt of written order from the Owner. If the Contractor fails to make such repairs or replacements promptly, the Owner reserves the right to do the work and the Contractor and his surety shall be liable to the Owner for the cost thereof.

1.04 BOND

The Contractor shall provide a bond to guarantee performance of the provisions contained in Paragraph "Maintenance and Guarantee" above, and Page C-7 of the Contract Documents.

PART 2: MATERIALS

2.01 CLEANING MATERIALS

As recommended by the manufacturer of surface to be cleaned.

PART 3: EXECUTION

3.01 CLEANING

- A. Exterior Cleaning: Sweep paved surfaces; rake other surfaces or grounds.
- B. Final Cleaning: Remove all tools, equipment, surplus materials, and rubbish. Refinish surfaces of existing facilities that are marred, scratched, or damaged to match original condition. Remove grease, dirt, stains, foreign materials, and labels from interior and exterior finished surfaces. Do any required waxing and polishing. At time of final inspection, project shall be thoroughly clean and ready for use.

3.02 PROJECT RECORD DRAWINGS

- A. Using red colored ink, make changes on a set of clean prints of original tracings. Show all changes and revisions to the original design that affect the permanent structures and will exist in the completed work. Reference underground utilities to semi-permanent or permanent physical objects. Reference water, sewer, telephone, and electric lines to corners of buildings. Show invert elevations at structures, grade changes, valves, and fittings for all pipelines 6-inches in diameter and larger. Include schematic diagrams for all electrical equipment with terminal numbers shown.
- B. Keep record drawings current. Inspection will be made monthly and will be required prior to the submittal of Progress Payments. Certification by Contractor of accuracy and completeness will be required on monthly submitted payment requisitions. Project record drawings are the property of the Owner and shall be delivered to the Engineer before closeout.

3.03 SUBSTANTIAL COMPLETION AND FINAL INSPECTION

- A. Submit written certification that the project, or a designated portion of the project, is substantially complete, and request, in writing, a final inspection. The Engineer will make an inspection within 10 days of receipt of the request.
- B. When the Engineer determines that the work is substantially complete, he will prepare a list of deficiencies that need to be corrected before final acceptance and issue a certificate of Substantial Completion with the deficiencies noted.
- C. If the Engineer determines that the work is not substantially complete, he will immediately notify Contractor, in writing, stating reasons. After completing work, the Contractor shall resubmit certification and request a new final inspection.

3.04 ACCEPTANCE OF THE WORK

- A. After all deficiencies have been corrected, a Letter of Final Acceptance will be issued.
- B. Acceptance may be given before correction of deficiencies that do not prevent operation and use of the facility; however, final payment will be withheld until all deficiencies are corrected.
- C. Until receipt of Letter of Final Acceptance, Contractor shall be responsible for the work of this Contract.

3.05 OPERATING INSTRUCTIONS (NOT APPLICABLE)

After equipment and systems are complete and operating, the Contractor or his suppliers shall, in cooperation with Engineer, instruct Owner personnel how to operate them.

3.06 START-UP/TRAINING (NOT APPLICABLE)

The Contractor shall demonstrate systems and instruct Owner personnel in their correct operation. This instruction shall include familiarizing Owner personnel with locations of switches, junction boxes, and circuiting. The Contractor shall have completed all startup and training defined in each individual applicable specification before project closeout.

3.07 CLOSEOUT SUBMITTALS

- A. Submit before payment request.
- B. Project Record Drawings: As specified above.
- C. Written Guarantees and Bonds: As specified in individual sections.
- D. Spare Parts, Special Tools, and Materials: As specified in individual sections.
- E. Keys and Keying Schedule: Submit all keys including duplicates. Wire all keys for each lock securely together. Tag and plainly mark with lock number or equipment identification, and indicate physical location, such as building and room name or number, or panel or switch number.
- F. Operating Handles and Special Tools: Clearly identify as to related equipment.

3.08 POST-CONSTRUCTION INSPECTION

Before expiration of guaranty period, Engineer will inspect project and notify Contractor in writing of all deficiencies.

END OF SECTION

SECTION 02010**SUBSURFACE CONDITIONS****PART 1: GENERAL****1.01 DESCRIPTION**

Prior to bidding, the Contractor should visit the site and acquaint himself with all existing conditions. Bidders may make their own subsurface investigations to satisfy themselves as to site and subsurface conditions including, but not limited to, soil moisture conditions, current groundwater elevations, depth to bedrock and soundness of bedrock. Such subsurface investigations shall be performed only under time schedules and arrangements approved in advance by the Owner. It shall be the responsibility of the Contractor to satisfy himself of the type of soil and the level of the water table to be encountered during construction of the facilities. The bidder shall make his own deductions and conclusions as to the nature of the materials to be excavated; the difficulties which may arise from the subsurface conditions and of doing any other work affected by the subsurface conditions and shall accept full responsibility therefore.

1.02 QUALITY ASSURANCE

A Geotechnical Engineer will be retained by the Owner to provide testing and inspection of work in connection with excavating, filling, compacting, and grading.

PART 2: MATERIALS

Not Used.

PART 3: EXECUTION

Not Used.

END OF SECTION

SECTION 02100

DEMOLITION, CLEARING, GRUBBING, AND STRIPPING

PART 1: GENERAL

1.01 DESCRIPTION

Work Included: Demolition, clearing, grubbing, and stripping required for this work includes, but is not necessarily limited to:

- A. Felling and removal of trees, stumps, roots, and tree debris.
- B. Removal of surface rock and all debris.
- C. Removal of surface organic topsoil layer.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02010: Subsurface Conditions
- B. Section 02200: Earthwork
- C. Section 02223: Trenching, Backfilling, and Compacting
- D. Section 02225: Structure Excavation and Backfill
- E. Section 02270: Stormwater Runoff Control Program
- F. Section 15010: General Process and Onsite Utility Piping Provisions
- G. Appendix : Geotechnical Report

1.03 LIMITS OF WORK

Perform demolition, clearing, grubbing, and stripping operations to the following limits:

- A. Demolition: Perform demolition of existing facilities as designated on the contract drawings, or as needed to execute the construction work.
- B. Clearing: Perform clearing operations as needed to execute the construction work.
- C. Grubbing: Perform grubbing operations at all locations identified for clearing.
- D. Stripping: Perform stripping operations at the south levee locations and as needed to execute the construction work.

1.04 CLEARING

- A. Unless otherwise specified in the Geotechnical Report perform clearing operations as directed below:

- 1. Remove and dispose of trees, snags, stumps, shrubs, brush, limbs, and other vegetative growth to the limits defined in Section 1.03. Remove all evidence of branches greater than 1-inch in diameter of thickness. Remove and dispose of trash piles and rubbish. Protect structures and piping above and below ground, trees, shrubs, and vegetative growth and fencing which are not designated for removal or which exist outside project limits.

1.05 GRUBBING

- A. Unless otherwise specified in the Geotechnical Report perform grubbing operations as described below:

- 1. After clearing, remove and dispose of wood or root matter, including stumps, trunks, roots, or root systems greater than 1-inch in diameter to the limits defined in Section 1.03.

1.06 STRIPPING

- A. Unless otherwise specified in the Geotechnical Report perform stripping operations as described below:

- 1. After grubbing, strip the organic material to the limits defined in Section 1.03 to a depth of not less than 6-inches. Upon completion of the stripping operation, the remaining material, if utilized for structural fill, shall not exceed a concentration of organics in excess of 3 percent by dry weight. Dilution shall be accomplished by means of diskings.

1.07 QUALITY ASSURANCE

- A. Qualifications of Workmen: Provide at least one person who shall be present at all times during tree clearing and grubbing operations and who shall be thoroughly familiar with the types of trees involved and who shall direct the trimming of roots and limbs where required. All tree removal and trimming shall be in compliance with applicable Placer County Standards and ordinances.
- B. Codes and Standards: In addition to complying with all pertinent codes and regulations comply with the requirements of those insurance carriers providing coverage for this work.

1.08 JOB CONDITIONS

- A. Dust Control: Use all means necessary to prevent the spread of dust during performance of the work; thoroughly moisten all surfaces as required to prevent dust being a nuisance to the public, neighbors, and concurrent performance of other work on the site. Wind in excess of 10 MPH causing dust to leave site will require Contractor to limit dust causing activities.

- B. Burning: On-site burning will not be permitted.
- C. Protection: Use all means necessary to protect existing objects designated to remain and, in the event of damage, immediately notify the Engineer and make all repairs and replacements necessary for approval by the Engineer at no additional cost to the Owner.

PART 2: MATERIALS

2.01 TEMPORARY BARRICADES

Unless otherwise specifically approved by the Engineer, use only new and solid lumber of utility grade or better to construct temporary barricades around the objects designated to remain.

2.02 EXPLOSIVES

Use of explosives on this job will not be allowed unless specifically approved by the Owner and Engineer.

2.03 OTHER MATERIALS

All other material, not specifically described but required for proper completion of the work of this Section, shall be as selected by the Contractor subject to approval of the Engineer.

PART 3: EXECUTION

3.01 PREPARATION

- A. Notification: Notify the Engineer at least two full working days prior to commencing the work of this section.
- B. Site Inspection:
 - 1. Prior to all work of this section, carefully inspect the entire site and all objects designated to be removed and to be preserved.
 - 2. Locate all existing inactive utility lines to be encountered by the new work and determine all requirements for disconnecting and capping. Abandonment of piping requires capping at each end or plugging with concrete to the satisfaction of the Engineer.
 - 3. Locate all existing active utility lines traversing the site and determine the requirements for their protection.
- C. Clarification:
 - 1. The Drawings do not purport to show all objects existing on the site.
 - 2. Before commencing the work of this section, verify with the Engineer all objects to be removed and all objects to be preserved.

D. Scheduling:

1. Schedule all work in a careful manner with all necessary consideration for neighbors, operation of existing facilities, and the public.
2. Avoid interference with the use of, and passage to and from, adjacent buildings and facilities.

E. Disconnection of Utilities: Before starting site operations, disconnect or arrange for the disconnection of all utility services designated to be removed, performing all such work in accordance with the requirements of the utility company or Owner involved.

F. Protection of Utilities: Preserve in operating condition all active utilities traversing the site and designated to remain.

3.02 STRUCTURE DEMOLITION

A. Facilities so designated on the plans shall be demolished, and all materials therefrom shall become the property of the Contractor and shall be removed and disposed of away from the site. Any equipment or pipework connected within a structure which is designated to be removed and saved or relocated shall be removed and delivered to the storage facility as directed by the Engineer before demolition begins. All other equipment within the structure shall become the property of the Contractor.

B. All concrete and rock shall be removed to firm undisturbed soil and scarified to a depth of 12 inches, unless otherwise noted, and shall be disposed of off-site. Concrete not removed shall be broken to prevent entrapment of water, as directed by the Engineer. Concrete includes all reinforcement and embedded items. Pipework and conduit within 10 feet of a structure shall also be removed to firm undisturbed soil and scarified to a depth of 12 inches unless otherwise noted.

C. Safety Requirements: The Contractor's attention is directed to the provisions of Subpart T of the OSHA Safety and Health Standards for Construction and the provisions of Article 31 of the Construction Safety Orders of the California Division of Industrial Safety governing the work of demolition. The Contractor shall perform all the work hereunder in accordance with said provisions, and where in conflict, the more stringent shall apply.

D. Backfill and Grading: After facilities have been demolished and all material removed, any remaining depression or hole shall be backfilled and the area finish graded as specified in Section 02200. Rubble and broken concrete will not be allowed to be used as fill material.

3.03 ROADWAY DEMOLITION

A. Where shown on the contract drawings, the Contractor shall remove entire pavement section including base material. This will also be necessary where deemed by the Engineer that extensive pipe construction has caused a loss of pavement integrity. Base material may be stockpiled and reused where appropriate and only with the approval of the Engineer.

- B. Asphalt concrete, concrete curb, and gutter materials to be demolished shall be removed from the site by the Contractor at no additional cost to the Owner.

3.04 PIPE DEMOLITION

- A. Unless otherwise specified, or in conflict with a proposed pipeline or structure, all pipes shown to be demolished shall be abandoned in place and have each end capped with at least a 24-inch long plug of class C concrete or grout material within the pipe. Piping subject to internal pressure upon abandonment shall be capped with pressure retaining caps or plugs.
- B. All pipe materials to be removed including pipe, fittings, valves, and thrust blocking shall be removed from the site by the Contractor at no additional cost to the Owner.

3.05 CLEARING AND GRUBBING

A. Area to be Cleared & Grubbed:

1. The Contractor shall restrict clearing and grubbing to the areas designated for new construction or adjustment of grades on the plans. Surrounding trees shall be protected from damage.
2. Where limbs or roots of trees designated to remain extend into work areas, the limbs or roots shall be trimmed in accordance with the provisions of this section.

B. Felling of Trees:

1. Use all necessary care to protect the roots and branches of trees designated to remain, and to prevent damage to persons and properties.
2. Immediately after felling a tree, remove the branches, cut trunk and limbs as necessary for removal, and clear the debris. Remove tree roots within a minimum of 3 feet below the proposed finish grade.

C. Trimming of Trees:

1. In company with the Engineer, ascertain the limbs and roots which are to be trimmed and clearly mark them to designate the approved point of cutting.
2. Cut evenly, using proper tools and skilled workmen to achieve neat severance with the least possible damage to the tree.
3. In the case of root cuts, apply wet burlap or other protection approved by the Engineer, as required, to prevent drying out.

D. Grubbing:

Remove all surface rocks and all stumps, roots, and vegetation within the limits of construction. Roots shall be removed to at least 3 feet below proposed finish grade.

3.06 PLACEMENT OF STRIPPINGS

As directed by the Engineer, initially stockpile strippings and then spread on project site area indicated on the Drawings.

3.07 CONSTRUCTION OF BARRICADES

A. Layout:

1. At all trees designated to be preserved, construct a temporary barricade around the tree at the tree's approximate drip line.
2. Construct barricades at least three feet high, consisting of two inch by four inch or larger posts set at least 18 inches into the ground at not more than six feet on centers, joined at the top by one inch by six inch or larger boards firmly nailed to the posts. Metal post with orange safety fencing may also be used if allowed by the local Owner having jurisdiction.

B. Protection:

1. Take special care in setting posts to not damage tree roots.
2. Do not permit stockpiling of materials or debris within the barricaded area nor permit the earth surface to be changed in any way except as specifically approved by the Engineer.

C. Maintenance: All protective fencing shall be inspected and maintained by the contractor at weekly intervals. Any damaged fencing shall be restored within one week.

D. Removal of Barricades: All protective fencing including posts and fabric shall be removed from the site at the completion of the work at the Contractor's expense.

3.08 REMOVAL OF DEBRIS

- A. Remove all debris from the site and leave the site in a neat and orderly condition to the approval of the Engineer. Dispose of debris off site at a location approved by the Engineer.
- B. Removal of demolished materials shall be included in the applicable lump sum base bid item and shall not be paid on a unit cost basis.

END OF SECTION

SECTION 02140

DEWATERING

PART 1: GENERAL

1.01 SCOPE

- A. The work of this section consists of providing all labor, materials, and equipment necessary to dewater trench and structure excavations.
- B. Disposal of water entering excavation or other parts of the work.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02010: Subsurface Conditions
- B. Section 02200: Earthwork
- C. Section 02223: Trenching, Backfilling, and Compacting
- D. Section 02225: Structure Excavation and Backfill

1.03 SUBMITTALS

- A. In accordance with Section 01300.
- B. Two weeks prior to installation of dewatering facilities and commencement of excavation, submit:
 - 1. A dewatering plan prepared and submitted to the Engineer for approval.
 - 2. Drawings and descriptions indicating numbers, locations, arrangements, depths, capacities, and construction details, as applicable, of all dewatering system equipment and components, including standby equipment and components.
 - 3. Methods of disposal of pumped water.
 - 4. Methods of diverting precipitation and surface water away from excavations.
 - 5. Method for collecting and removing precipitation within excavations as necessary.
 - 6. Copies of executed permits necessary to perform work.

1.04 PERMITS

The Contractor shall obtain and comply with all required permits for the dewatering system and operation, disposal of water, and pay all associated fees.

PART 2: MATERIALS

2.01 FACILITIES AND EQUIPMENT

The Contractor shall provide all necessary facilities and equipment for the dewatering operations.

PART 3: EXECUTION

3.01 GENERAL REQUIREMENTS

- A. The Contractor shall have on hand, at all times, sufficient pumping equipment and machinery in good working condition and shall have available, at all times, competent workmen for the operation of the pumping equipment. Adequate standby equipment shall be kept available at all times to insure efficient dewatering and maintenance of dewatering operation during power failure.
- B. Dewatering shall commence at an appropriate time prior to commencing excavation, and shall be continuous until facilities and structures are completed, backfilled, and, as appropriate, filled with water to prevent damage from hydrostatic uplift and/or floatation.
- C. Excavations extending below site groundwater levels or which encounter perched groundwater within permeable soil layers shall be dewatered. Dewatering of narrow trench excavations that penetrate less than a few feet below the groundwater level and do not encounter loose and/or cohesionless soils may be possible by directing inflow to a sump where water can be removed by a pump. Temporary dewatering of wider, deeper, and/or more extensive excavations may require well points, perimeter trench drains, and/or deep sumps. To help maintain bottom stability of wider, deeper, and/or more extensive excavations, groundwater levels shall be drawn-down a minimum of 3 feet below the lowest portion of the excavation.
- D. Dewatering shall at all times be conducted in such a manner as to preserve the undisturbed bearing capacity of the subgrade soils at proposed bottom of excavation and protect temporary excavation slope stability during construction. If foundation soils are disturbed or loosened by the upward seepage of water or an uncontrolled flow of water, the affected areas shall be excavated and replaced with drain rock on approved geotextile fabric at no additional cost to the Owner.

3.02 DISPOSAL OF WATER

- A. The Contractor shall be responsible to design and control the dewatering operations such that disposal of water does not cause erosion or other damage and such that water to be disposed of is free from silt and other objectionable materials and in compliance with any applicable permit requirements. Settling basins and/or other means shall be used as necessary.
- B. Contractor shall utilize applicable construction activity Best Management Practices (BMP) for the project. Refer to "Caltrans Storm Water Quality Handbooks, Construction Site Best Management Procedures Manual", March 2003 or Latest Edition. Groundwater discharges are included in Section NS-2.

- C. The Contractor shall be responsible for obtaining a Dewatering General Permit for any dewatering activity, including removal and discharge of groundwater, accumulated rainwater and removing water from cofferdams or diversions, if necessary. Dewatering activities shall comply with the conditions of the Central Valley Regional Water Control Board's General Permit for Dewatering Activities.

3.03 TERMINATION OF DEWATERING

The termination of dewatering operations shall be performed in such a manner as to maintain the undisturbed state of the natural foundation soils, prevent disturbance of compacted backfill and prevent flotation or movement of structures, pipelines and sewers. Dewatering devices/features shall either be removed or abandoned in place in accordance with legal regulatory requirements and as approved by the Engineer.

END OF SECTION

SECTION 02223**TRENCHING, BACKFILLING, AND COMPACTING****PART 1: GENERAL****1.01 DESCRIPTION**

The work of this section consists of trenching and backfilling for the construction and installation of pipelines, conduits and cables. All trenching will be open cut, unless otherwise approved in writing. It includes all clearing and grubbing, trenching or tunneling, construction of cribbing and cofferdams, dewatering, incidental work, and providing specified backfill.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01667: Testing of Pipelines
- B. Section 02010: Subsurface Conditions
- C. Section 02100: Demolition, Clearing, Grubbing, and Stripping
- D. Section 02140: Dewatering
- E. Section 02200: Earthwork
- F. Section 02513: Asphalt Concrete Paving
- G. Section 03100: Concrete

1.03 SUBMITTALS

- A. Submit a copy of a report from a testing laboratory verifying that backfill material conforms to the specified gradations of characteristics for granular material, imported sand, rock refill for foundation stabilization, and water.
- B. Submit method of compaction in pipe zone including removal sequence of shoring where used.
- C. Provide written description of barricading, shoring, cribbing, bracing, and sloping precautions.

1.04 PROJECT CONDITIONS

- A. Obtain all required permits and licenses before installing utilities under existing roads, other than City roads, and follow the rules and requirements of the authority having jurisdiction.
- B. Arrange construction sequences to provide the shortest practical time that the trenches will be open to avoid hazard to the treatment plant staff, subcontractors, and public, and to minimize the possibility of trench collapse.

1.05 TESTING FOR COMPACTION

- A. The Owner will test for compaction at locations determined by the Owner.
- B. Relative compaction is defined as the ratio, in percent, of the as-compacted dry density to the laboratory maximum dry density. The laboratory maximum dry density is defined in accordance with ASTM D 1557, latest edition.
- C. Where compaction tests indicate a failure to meet the specified compaction, the Owner will take additional tests every 50 feet in each direction until the extent of the failing area is identified. Rework the entire failed area until the specified compaction has been achieved.

1.06 STREET ZONE

The street zone includes the asphalt concrete and aggregate base pavement section placed over the trench backfill.

1.07 TRENCH ZONE

The trench zone includes the portion of the trench from the top of the pipe zone to the bottom of the street zone in paved areas or to the existing surface in unpaved areas.

1.08 PIPE ZONE

The pipe zone shall include the full width of trench from the bottom of the pipe or conduit to a horizontal level above the top of the pipe, as shown on the contract drawings. Where multiple pipes or conduits are placed in the same trench, the pipe zone shall extend from the bottom of the lowest pipes to a horizontal level above the top of the highest or topmost pipe.

1.09 PIPE BASE OR BEDDING

The pipe base or bedding shall be defined as a minimum 4-inches thick layer of material immediately below the bottom of the pipe or conduit and extending over the full trench width in which the pipe is bedded.

PART 2: MATERIALS

2.01 GRANULAR MATERIAL FOR BACKFILL - STREET ZONE

Granular material or granular soil for backfill used above the pipe zone shall be ¾-inch – Class 2 Aggregate Base conforming to Caltrans Standard Specification 26-1.02.

2.02 GRADED SAND - - PIPE BASE AND PIPE ZONE

Graded sand used for the pipe base and pipe zone shall be free of clay or organic material and have the following gradation:

SIEVE SIZE	PERCENT PASSING BY WEIGHT
3/8-INCH	100
No. 4	92 – 100
No. 8	90 - 100
No. 16	80 - 100
No. 30	65 – 100
No. 50	40 - 80
No. 100	0 - 40
No. 200	0 – 12

Imported sand shall have a sand equivalent not less than 28 per ASTM D 2419.

2.03 TRENCH ZONE MATERIAL

Trench zone material shall conform to engineered fill, in accordance with Section 02200. Preliminary investigations indicate that native materials will not meet these requirements.

2.04 CEMENT SLURRY - -PIPE BASE AND PIPE ZONE ALTERNATIVE

Cement slurry backfill shall consist of Type I or II portland cement, imported sand, and sufficient water for workability, per Caltrans Standard Specification 19-3.062. The mix shall produce a minimum 28-day strength of 50 PSI and 1×10^{-6} cm/sec permeability. Submit a mix design and confirming test results per Section 01300.

2.05 REFILL FOR FOUNDATION STABILIZATION

¾ - inch crushed rock shall be used in areas where pipelines extend into loose medium dense sands below the water table.

2.06 CONCRETE FOR PIPE ENCASEMENT AND THRUST BLOCKS

- A. Concrete for pipe encasement and thrust blocks shall be Class C per Section 03100, unless otherwise shown in the drawings.
- B. Provide thrust blocks at fittings in pipe having rubber gasket bell and spigot or unrestrained mechanical joints as directed by the Engineer. Provide thrust blocks at all tees and elbows 45° and greater, or as noted on contract plans and in the general or specific pipe specifications.
- C. Size thrust block bearing area for 900 PSF. Size thrust blocks based on the test pressures provided in the contract documents.

2.07 WATER FOR COMPACTION

Water for compaction shall be clean and free of oil, acids, salts, and other deleterious substances. Water shall be supplied by the Contractor at no additional expense to the Owner. The Contractor

shall coordinate with the Engineer for the use of the water. The Contractor shall provide all necessary labor and equipment to extract the water and shall be responsible for the repair of any damage to the existing facilities which can be attributed to this operation.

PART 3: EXECUTION

3.01 COMPACTION REQUIREMENTS

Unless otherwise shown in the drawings or otherwise described in the specifications for the particular type of pipe installed, relative compaction in pipe trenches shall be as follows:

- A. Pipe Base: 95% relative compaction.
- B. Pipe Zone: 95% relative compaction.
- C. Backfill in Trench Zone not Beneath Paving or Aggregate Base Access Roadways: 90% relative compaction.
- D. Backfill in Trench Zone to Street Zone in Paved Areas or Within Limits of Aggregate Base Roadways: 95% relative compaction.
- E. Backfill in Street Zone in Paved Areas or within Limits of Aggregate Base Roadways: 95% of relative compaction.
- F. Refill for Foundation Stabilization: 95% relative compaction.
- G. Refill for Overexcavation: 95% relative compaction.

3.02 MATERIAL REPLACEMENT

Remove and replace any trenching and backfilling material which does not meet the specifications, at the Contractor's expense.

3.03 SLOPING, SHEETING, SHORING, AND BRACING OF TRENCHES

Trenches shall have sloping, sheeting, shoring, and bracing conforming with 29CFR1926, Subpart P – Excavations, CAL/OSHA requirements, and the General Conditions.

3.04 SIDEWALK, PAVEMENT, AND CURB REMOVAL

Cut bituminous and concrete pavements regardless of the thickness and curbs and sidewalks prior to excavation of the trenches with a pavement saw or pavement cutter. Width of the pavement cut shall be at least equal to the required width of the trench at ground surface. Haul pavement and concrete materials from the site. Do not use for trench backfill.

3.05 TRENCH WIDTHS

Trench widths in the pipe zone shall be as shown in the drawings. If no details are shown, maximum width shall be 24 inches greater than the pipe outside diameter. Comply with 29CFR Part 1926 Subpart P – Excavations. Trench width at the top of the trench will not be limited except where width of excavation would undercut adjacent structures and footings. In such case, width of

trench shall be such that there is at least 2 feet between the top edge of the trench and the structure or footing.

3.06 TRENCH EXCAVATION

Excavate the trench to the lines and grades shown in the drawings with allowance for pipe thickness, sheeting and shoring if used, and for pipe base or special bedding. If the trench is excavated below the required grade, refill any part of the trench excavated below the grade at no additional cost to the Owner with foundation stabilization material. Place the refilling material over the full width of trench in compacted layers not exceeding 6-inches deep to the established grade with allowance for the pipe base or special bedding.

3.07 DEWATERING

A. Provide and maintain means and devices to remove and dispose of all water entering the trench excavation during the time the trench is being prepared for the pipelaying, during the laying of the pipe, and until the backfill at the pipe zone has been completed. These provisions shall apply during the noon hour as well as overnight. Dispose of the water in a manner to prevent damage to adjacent property and in accordance with regulatory agency requirements. Do not drain trench water through the pipeline under construction. Do not allow groundwater to rise around the pipe until jointing compound has set hard. See Section 02140 – Dewatering.

B. Dewater in accordance with Section 02140.

3.08 LOCATION OF EXCAVATED MATERIAL

During trench excavation, place the excavated material only within the working area. Do not obstruct any roadways or streets. Conform the federal, state, and local codes governing the safe loading of trenches with excavated material. All trenches shall be backfilled at the end of each day's operation. Trench patching with asphalt concrete shall be completed within 24 hours of trench backfill.

3.09 LENGTH OF OPEN TRENCH

Limit the length of open trench to 500 feet in advance of pipelaying or amount of pipe installed in one working day, whichever is less, and not more than 500 feet in the rear of pipelaying, except as modified by encroachment permit requirements. At the end of each working day, the trench shall be backfilled to match existing surface.

3.10 TRENCH EXCAVATION IN BACKFILL AND EMBANKMENT AREAS

Construct trench excavation for pipe, pipes, or conduit in backfill or embankment areas in accordance with the following procedures:

- A. Construct and compact the embankment to an elevation of 1-foot minimum over the top of the layer of the largest pipe or conduit to be installed.
- B. Excavate trench in the compacted backfill or embankment. Place cement slurry in the pipe base and pipe zone. Compact backfill above the pipe zone to the relative compaction required for trench zone backfill.

3.11 FOUNDATION STABILIZATION

- A. After the required excavation has been completed, the Owner and/or Agency will inspect the exposed subgrade to determine the need for any additional excavation. It is the intent that additional excavation be conducted in all areas within the influence of the pipeline where unacceptable materials exist at the exposed subgrade. Overexcavation shall include the removal of all such unacceptable materials that exists directly beneath the pipeline to the required trench width and to the depth required. Backfill the trench to subgrade of pipe base with refill material for foundation stabilization. Place the foundation stabilization material over the full width of the trench and compact in layers not exceeding 6-inches deep to the required grade. Foundation stabilization work shall be executed in accordance with a change order.
- B. Refill used by the Contractor for his convenience will not receive any additional payment.

3.12 INSTALLING BURIED PIPING

- A. Backfill per the detailed piping specification for the particular type of pipe and per the following.
- B. Handle pipe in such a manner as to avoid damage to the pipe. Do not drop or dump pipe into trenches under any circumstances.
- C. Inspect each pipe or fitting prior to placing into the trench. Inspect the interior and exterior protective coatings. Patch damaged areas in the field with material recommended by the protective coating manufacturer. Clean ends of pipe thoroughly. Remove foreign matter and dirt from inside of pipe and keep clean during and after installation.
- D. If the pipeline is designed for use as reclaimed water, the pipe shall be identified as such in one of the following manners:
- F. Grade the bottom of the trench to the line and grade to which the pipe is to be laid, with allowance for pipe thickness and bedding depth. Remove hard spots that would prevent a uniform thickness of bedding. Place the specified thickness pipe base material over the full width of trench. Grade the top of the pipe base ahead of the pipelaying to provide firm, continuous, uniform support along the full length of pie, and compact to the relative compaction specified herein. After laying each section of the pipe, check the grade and alignment and correct any irregularities prior to laying next joint.
- G. Excavate bell holes at each joint to permit proper assembly and inspection of entire joint. Fill the area excavated for the joints with the bedding material specified or detailed in the drawings.
- H. When installing pipe, do not deviate more than 1-inch from line or 1/4 -inch from grade. Measure elevation at the pipe invert. The Contractor shall verify pipe grade at not more than 80 feet intervals, in the presence of the Owner's Representative.
- I. After pipe has been bedded, place pipe zone material simultaneously on both sides of the pipe, in maximum 6-inch lifts, keeping the level of backfill the same on each side. Carefully place the material around the pipe so that the pipe barrel is completely supported and that no

voids or compacted areas are left beneath the pipe. Use particular care in placing material on the underside of pipe to prevent lateral movement during subsequent backfilling.

- J. For pipe sizes greater than 12-inches in diameter, no more backfill material than the lesser of 6-inches or $1/3^{\text{rd}}$ of the pipe diameter shall be placed prior to shovel slicing. Sufficient care shall be taken to prevent movement of the pipe during shovel slicing. Shovel slicing shall be witnessed by the Field Inspector and/or Geotechnical Engineer.
- K. Compact each lift to the relative compaction specified herein.
- L. Push the backfill material carefully onto the backfill previously placed in the pipe zone. Do not permit free fall of the material until at least 2 feet of cover is provided over the top of the pipe. Do not drop sharp, heavy pieces of material directly onto the pipe or the tamped material around the pie. Do not operate heavy equipment over the pipe until at least 3 feet of backfill has been placed and compacted over the pipe.
- M. When pipelaying is not in progress, including the noon hours, close the open ends of pipe. Do not allow trench water, animals, or foreign material to enter the pipe.
- N. Remove and dispose of all water entering the trench during the process of pipelaying. Keep the trench dry until the pipelaying and jointing are completed.

3.13 BACKFILL COMPACTION

Compact per the detailed piping specification for the particular type of pipe and per the following:

- A. Compact trench backfill to the specified relative compaction. Compact by using mechanical compaction or hand tamping. Do not use high impact hammer-type equipment except where the pipe manufacturer warrants in writing that such use will not damage the pipe. Ponding or jetting is not allowed.
- B. Compact material placed within 12-inches of the outer surface of the pipe by hand tamping only.
- C. Do not use any axle-driven or tractor-drawn compaction equipment within 5 feet of building walls, foundations, or other structures.

3.14 CONTROLLED LOW STRENGTH MATERIAL (CLSM) BACKFILL

When Controlled Low Strength Material is utilized, pipe shall be supported by mounding imported backfill material or sandbags filled with imported backfill material. Material shall conform to Section 03110.

END OF SECTION

SECTION 02225**STRUCTURE EXCAVATION AND BACKFILL****PART 1: GENERAL****1.01 DESCRIPTION**

The work of this section consists of all structure excavation and backfill required to complete the work and furnishing select or imported backfill. It includes disposal of surplus or unsuitable material.

1.02 QUALITY ASSURANCE

Evaluation of all fill materials and testing required to determine compliance for the work of this section will be the responsibility of the Owner and at the Owner's expense. The Contractor shall cooperate by rerouting equipment or by temporarily closing the immediate work area being tested. Areas where test results indicate noncompliance shall be corrected before placing additional backfill.

1.03 PROJECT CONDITIONS

Take necessary precautions to prevent the entrance of soils and other materials into streambeds, lakes, or water courses.

1.04 RELATIVE COMPACTION TEST

- A. The Owner will test for compaction at locations determined by the Owner.
- B. Relative compaction is defined as the ratio, in percent, of the as-compacted dry density to the laboratory maximum dry density. The laboratory maximum dry density is defined in accordance with ASTM D 1557, latest edition.
- C. Where compaction tests indicate a failure to meet the specified compaction, the Owner will take additional tests every 50 feet in each direction until the extent of the failing area is identified. Rework the entire failed area until the specified compaction has been achieved.

PART 2: MATERIALS**2.01 ENGINEERED FILL**

See Section 02200 for Material Requirements.

2.02 CRUSHED ROCK

Material shall be crushed rock of one-inch (3/4") maximum size, with no material passing a Number four (#4) sieve.

2.03 AGGREGATE BASE

Aggregate base shall be Class 2 aggregate base, 3/4" maximum as specified in Section 26 of the California Department of Transportation Standard specifications.

2.04 DRAIN ROCK

Drain rock shall be Class 1, Type B permeable material as specified in Section 68 of the California Department of Transportation Standard specifications.

2.05 STRUCTURAL GEOTEXTILE FABRIC

Geotextile fabric under structures shall be Amoco 4551 or equal.

2.06 FILTER FABRIC

Filter fabric shall be non-woven geotextile fabric, Amoco 4550, or equal.

PART 3: EXECUTION

3.01 CLEARING

Perform clearing operations in accordance with Section 02100.

3.02 STRUCTURAL EXCAVATION

A. General: All excavation for structures shall be done to the dimensions and levels indicated on the drawings or specified herein.

1. Under all structures, the Contractor shall:

a. Excavate to subgrade, remove and dispose of organic material and unsuitable soils. Excavation shall be made to a minimum 3 feet outside the lines of the structure to be constructed therein as may be required for proper working methods, the erection of forms and the protection of the work. Care shall be taken to preserve the foundation surfaces shown on the drawings in an undisturbed condition. If the Contractor excavates or disturbs the foundation surfaces shown on the drawings or specified herein without written authorization of the Engineer he shall replace at his expense such foundations with compacted gravel foundation fill or other material approved by the Engineer in a manner which will show by test an equal bearing strength with the undisturbed foundation material.

b. Scarify the surface a minimum depth of 8-inches, bring the moisture

content to optimum plus 2 percent or above, and compact to 90 percent minimum relative compaction.

- c. Place engineered fill in 8-inch maximum lifts to obtain subgrade elevations. Compaction shall be performed at a moisture content at least 2 percent above optimum to 90 percent minimum relative compaction.
2. Under all pavements, the Contractor shall:
- a. Excavate to below subgrade, remove and dispose of organic material and unsuitable soils.
 - b. Scarify the surface a minimum depth of 12-inches, bring the moisture content to optimum plus 2 percent or above and compact to 95 percent minimum relative compaction.
 - c. Place engineered fill in 8-inch maximum lifts to obtain subgrade elevations. Compaction shall be performed at a moisture content at least 2 percent above optimum to 95 percent minimum relative compaction.
3. Under all embankments, the Contractor shall:
- a. Excavate to below subgrade, remove and dispose of organic material and unsuitable soils.
 - b. Scarify the surface a minimum depth of 12-inches, bring the moisture content to optimum plus 2 percent or above and compact to 95 percent minimum relative compaction.
 - c. Place engineered fill in 8-inch maximum lifts to obtain subgrade elevations. Compaction shall be performed at a moisture content at least 2 percent above optimum to 90 percent minimum relative compaction.

Excavation shall be made to a minimum 3 feet outside the lines of the structure to be constructed therein as may be required for proper working methods, the erection of forms and the protection of the work. Care shall be taken to preserve the foundation surfaces shown on the drawings in an undisturbed condition. If the Contractor excavates or disturbs the foundation surfaces shown on the drawings or specified herein without written authorization of the Engineer he shall replace at his expense such foundations with compacted gravel foundation fill or other material approved by the Engineer in a manner which will show by test an equal bearing strength with the undisturbed foundation material.

- B. Bracing, Sheet piling, and Shoring: Care shall be exercised in excavating for lower footings not to disturb bearing under higher adjacent footings or structures. Existing structures and pipework shall be adequately braced and cared for so that no damage will result. The Contractor shall submit structural calculations and drawings signed and sealed by a civil engineer registered in the State of California showing members, connections, and anchorage of the proposed bracing, sheet piling, and shoring. The Contractor shall provide suitable sheet piling and shoring, where necessary, for protection of the excavations. All such

sheeting and shoring shall be removed unless otherwise specifically authorized.

- C. Unsuitable Materials: To suit field conditions, excavation below the depths shown may be ordered, but changes may only be made as directed. Soft, spongy, or unsuitable bearing material of any kind shall be entirely removed down to solid bearing soil and replaced with an engineered fill as specified herein. In such event only the excess excavation and fill will be paid for as extra work.
- D. Dewatering: Any water that may be encountered or that may accumulate in excavations shall be removed and kept out by pumping or other approved methods, and all construction shall be carried on in the dry. Water shall be kept down until structures are complete to above water, safe from uplift and horizontal water pressure and the backfill has been placed. Dewatering shall be in accordance with Section 02140.
- E. Approval of Excavation: The Contractor shall notify the Engineer when excavation for a structure is complete and no forms, reinforcing steel or concrete, shall be placed until the excavation has been approved by the Engineer. Once the excavation is approved, the Contractor must protect the work from flooding or groundwater uplift.
- F. Disposal of Waste Excavation: Excavated material determined by the Engineer to be unsuitable, or in excess of the amounts required for backfill shall be disposed on-site as shown on the drawings and as directed by the Engineer at no additional cost to the Owner.

3.03 STRUCTURAL FOUNDATIONS

Foundations and footings shall rest on suitable undisturbed soil or compacted subgrade. Over subgrade Contractor shall install a layer of aggregate as shown on the drawings. Aggregate layer shall be Class 2 aggregate base, completely encase aggregate layer in structural fabric (Amoco 4551 or equal).

3.04 ENGINEERED FILL

- A. General: All soil under structures, pavements, embankments, and at other locations where indicated on the drawings shall be made using engineered fill sub-base, carefully controlled and compacted on a prepared surface.
- B. Surface Preparation: The surface on which fill is to be placed shall be free of all vegetation, debris, or other objectionable material, and all large roots shall be grubbed out to a depth of at least 2 feet below footing, slab, or pavement elevations and 5 feet beyond the limits of the proposed improvements. The surface shall be scarified to a depth of 8 inches, brought to a moisture content of optimum plus 2 percent or above. It may be necessary to adjust the moisture content of the subgrade soil by watering or aeration to bring the moisture content of the soil near optimum in order that the specified densities can be obtained.
- C. Placement of Fill
 - 1. Fill materials shall be spread in a maximum of 8-inch lifts and shall have a uniform moisture content that will provide the specified dry density after compaction. If

necessary to obtain uniform distribution of moisture, water shall be added to each layer by sprinkling and the soil disced, harrowed, or otherwise manipulated after the water is added. If the material is too wet, the moisture content shall be reduced as necessary by spreading and aerating.

2. Field density tests shall be used to check the compaction of the fill materials. Sufficient tests shall be made on each layer by the Engineer to assure adequate compaction throughout the entire area. If the dry densities are not satisfactory, the contractor will be required to increase the weight of the roller or the number of passes as required to produce the specified densities.
3. Where trenches must be excavated in Engineered Fill these trenches shall be backfilled with the fill materials excavated. The backfill shall be placed in 6 inch layers and each layer compacted with pneumatic tampers to provide densities as specified above. Backfill placed adjacent to walls shall be placed in a similar manner to that specified for backfill in excavated trenches.
4. No fill shall be placed during weather conditions which will alter the moisture content of the fill materials sufficiently to make adequate compaction impossible. After placing operations have been stopped because of adverse weather conditions, no additional fill material shall be placed until the last layer compacted has been checked and found to be compacted to the specified densities.

3.05 BACKFILL AGAINST STRUCTURES

Material for filling and backfilling around structures shall be free from sod, large lumps, boulders, or rocks, roots, brush or other objectionable material, and shall be obtained from required excavations insofar as practicable. Should the material available from excavation be insufficient or unsuitable for the required use, the Contractor shall furnish and place suitable material. Do not place backfill against newly constructed concrete structures for a period of 14 days unless authorized by the Engineer. Hand-held compactors shall be used for backfill against concrete walls within a horizontal distance of $H/2$ of the structure, where H is defined as the vertical height of the backfill above the foundation. Backfill shall be placed in even, uniform lifts around the structure.

END OF SECTION

SECTION 02229

UTILITY LINE MARKING

PART 1: GENERAL

1.01 DESCRIPTION

The work of this section consists of furnishing and installing utility line marking, identifying devices for valves, and underground warning tape for buried utilities.

1.02 SUBMITTALS

- A. In accordance with Section 01300.
- B. Samples: 24-inch strips of tape, surface markers, and valve tags.
- C. Certification that the materials used in the tape fabrication meet the requirements of this section.
- D. Submit a complete schedule of all surface markers and valve box identification tags.

PART 2: MATERIALS

2.01 MARKING TAPE

- A. Capable of being inductively detected electronically.
- B. Construction: Metallic foil laminated between two layers of plastic film not less than 6 inches wide. The adhesive shall be colored and be compatible with the foil and film.
- C. Film: Inert plastic. Each film layer shall be not less than 0.0005 inch thick (1/2 mil).
- D. Foil: Not less than 0.001 inch thick (1 mil).
- E. Imprint: 3/4-inch or larger bold black letters.
- F. Legend: The buried utility line tape shall be identified with imprint such as "CAUTION: SEWER LINE BELOW" and the identification repeated on approximately 24-inch intervals.
- G. Detectable marking and warning tape shall be as manufactured by Lineguard, Inc., Paul Potter Associates, Christy's, all of Wheaton, Illinois; Griffolyn Company, Inc., Houston, Texas, or equal.

2.02 SURFACE MARKERS

- A. Location Stakes: A list of approved off-site location stakes include:

1. Carsonite #375 (as distributed by Berntsen International SURV-KAP Inc., or equal.)
2. 4" x 5" with anchor barb kit

B. Caution Labels:

1. Caution stickers attached -- #CW-112 and organization decal #P101
2. Placer County – Call Before Digging – 811 or 1(888) 344-7233

PART 3: EXECUTION

3.01 MARKING TAPE

- A. Install tape in backfill directly over each buried utility line, directly above the pipe zone.
- B. Where utilities are buried in a common trench, identify each line by a separate warning tape. Bury tapes side by side directly over the applicable line.

3.02 SURFACE MARKERS

Outside paved areas provide stakes for pipelines 24-inch and larger at 500 feet intervals and at all changes in alignment or end of pipe.

END OF SECTION

SECTION 02233

WATERING

PART 1: GENERAL

1.01 DESCRIPTION

The work of this section consists of furnishing, hauling, and applying water required in the compaction of embankments, backfills, subgrade, and base course, and for landscaping, dust control, leak testing, and other construction operations.

PART 2: MATERIALS

2.01 WATER

- A. The Contractor will be allowed to draw water only at the locations approved by the Engineer. The Contractor shall be responsible for coordinating with the Engineer for the use of this water. (NOT APPLICABLE)
- B. Leakage testing for hydraulic structures shall be conducted with, at a minimum, Tertiary treated effluent.
- C. No provision in this section is intended to prevent the Contractor from making arrangements for water from other than Owner sources. All costs involved shall be the responsibility of the Contractor's.
- D. Potable water for use by the Contractor for Construction or other purposes shall be coordinated by the Contractor at the Contractor's expense. (NOT APPLICABLE)

PART 3: EXECUTION

3.01 EQUIPMENT

Contractor shall provide all necessary pumping equipment, piping, meters, tanks, and water trucks to withdraw and utilize the water. Water trucks shall be of at least 1,000 gallon capacity, equipped with a spray bar of ample capacity and design to insure uniform application of water in the amounts required.

END OF SECTION

SECTION 02270

STORMWATER RUNOFF CONTROL PROGRAM

PART 1: GENERAL

1.01 DESCRIPTION

Because this project is less than 1.0 acre, the contractor shall submit a Water Pollution Control Plan describing the Best Management Practices (BMPs) planned to be used along with their locations marked on the contract drawings.

- A. Disposal of construction water from operations such as groundwater dewatering and water used for testing, disinfecting, and flushing pipelines is not part of the work under this section. Refer to Sections 02140, and 02223 for permit requirements for those discharges.

1.02 REFERENCES

- A. National Pollutant Discharge Elimination System (NPDES).
- B. State of California, State Water Resources Control Board, Regional Water Quality Control Board (SWRCB).
- C. United States Code of Federal Regulation (CFR):
 - 1. 40 - Protection of Environment:
 - a. 117 - Determination of reportable quantities for hazardous substance.
 - b. 302 - Designation, reportable quantities, and notification.

1.03 RELATED WORK DESCRIBED ELSEWHERE

- A. Section 01010: General Construction Information and Requirements
- B. Section 01300: Submittals
- C. Section 02223: Trenching, Backfilling, and Compacting

1.04 SUBMITTALS

- A. Water Pollution Control Plan
 - 1. List and descriptions of all BMPs that are planned to be implemented
 - 2. General location markups of BMPs on the contract drawings
 - 3. Spoils locations, hazardous waste area, stockpiling, etc.
- B. The Contractor shall submit a copy of the BMP Handbook with each BMP to be utilized check marked to show compliance or marked to show deviation.

- C. The submittal shall detail the Contractor's selected BMPs with brief justification on why that BMP is selected, the intended installation date and location on the site. BMP materials and specifications shall be provided, including, where applicable, reference to BMPs described in Specification Section 02273. If the Contractor believes additional or alternative BMPs are necessary, details shall be provided. The Contractor will be required to revise or supplement submitted information that is inadequate or incomplete in the opinion of the Engineer.
- D. Once the information is compiled, the Contractor will finalize and submit the proposed Erosion Control Plan (ECP) to the Owner and Engineer for final acceptance. The ECP will be posted on-site during the duration of the project for reference in compliance monitoring.
- E. The Contractor shall be responsible for taking the proper actions to prevent contaminants and sediments from entering the storm sewer drainage system should any unforeseen circumstance occur. The Contractor shall take immediate action if directed by the Engineer, or if the Contractor observes contaminants and/or sediments entering the storm drainage system, to prevent further stormwater from entering the system.
- F. In the event the Contractor desires to implement environmental protection BMPs differently than detailed in the Plans and Specifications or the ECP, the Contractor may provide a submittal with his alterations/amendments to the Engineer. All alterations or amendments must get prior authorization from the Engineer as outlined in the ECP. However, if the Contractor desires to implement alternative BMPs to those detailed exclusively in the ECP for an emergency repair to prevent an offsite discharge, he may do so without prior consent. No schedule delays will be allowed due to BMP revisions proposed by the Contractor, unless authorized by the Owner.

1.05 MEASUREMENT AND PAYMENT

The Contractor shall be responsible for all costs associated with the development of the ECP. The Contractor shall be responsible for the implementation of the ECP. This includes the installation, maintenance, and removal of erosion and sediment control practices specified in the ECP upon completion of the project or as requested by the Engineer. These costs shall be included in the lump sum bid amount.

PART 2: MATERIALS

2.01 EROSION CONTROL PLAN

The Contractor is responsible for implementing the Best Management Practices to maintain positive pollution prevention, as described in the ECP, in response to the monitoring program reports, or as circumstances require. Materials, and the costs thereof, for water pollution control plan are the responsibility of the Contractor.

3.04 MONITORING & REPORTING PROGRAM

- A. The Contractor shall implement the M&RP. The Contractor shall also be responsible for monitoring and inspecting his actions and the activities of those responsible to the Contractor.

B. Monitoring and Inspection:

The Contractor will be responsible for completing a Weekly Activity Log, which includes documentation of the following information:

1. Location (using grid map) of weekly construction activities;
2. Confirmation that the appropriate BMPs have been installed per the respective BMP specifications;
3. Confirmation that each BMP is being properly maintained per the respective BMP specifications;
4. Any corrective action taken by the Contractor to ensure proper BMP installation and maintenance;
5. Confirmation that proper housekeeping is being maintained at the site;
6. Confirmation that trash/debris is being controlled and properly stored in covered containers;
7. Confirmation that identified oil spills/leaks are being cleaned up and the contaminated waste and soils are being properly stored and disposed of; and,
8. Evidence that any leaking equipment or vehicles are being taken out of service and repaired prior to continued use.

The Contractor's Weekly Activity Log input will be reviewed for accuracy and completeness by the Engineer or an assigned representative of the Owner. The weekly logs become a part of the ECP as partial evidence of compliance with stormwater management regulations. Any deficiencies identified by the Engineer will be brought to the Contractor's attention and shall be corrected at no additional cost to the Owner.

In addition to the weekly Activity Log, it is the Contractor's responsibility to report to the Owner any discharges immediately after discovery. At the Owner's discretion, the Contractor may be required to notify the appropriate regulatory agency (i.e. Regional Board, DHS). These discharges may include, but are not limited to:

1. Fuels
2. Oils
3. Chemicals
4. Sanitary wastes
5. Process and wash waters
6. Sediment laden waters

- C. The Contractor shall allow representatives of the Owner, the Agency, the SWRCB, and/or other regulatory agencies to enter the construction site, inspect the construction site for compliance, and sample and monitor the construction site discharges.

- D. The M&RP may extend past the completion date for this contract. The Contractor's responsibilities for the M&RP will cease upon closure of three conditions: 1) acceptance by the Owner of all work under the contract; 2) the Contractor submits information to the Engineer verifying the site meets BMP listed in the ECP.

END OF SECTION

SECTION 02276

SITE RESTORATION AND EROSION CONTROL

PART 1 - GENERAL REQUIREMENTS

1.01 SECTION INCLUDES

- A. The work specified in this Section consists of providing, monitoring, maintaining, and removing temporary erosion and sedimentation controls and restoring site conditions as necessary.
- B. Temporary erosion controls include, but are not limited to, Best Management Practices (BMP's) such as: grassing, mulching, netting, and watering, and reseeding on-site surfaces and spoil and borrow area surfaces and providing interceptor ditches at ends of berms and at those locations ensuring the erosion during construction will be either eliminated or maintained within acceptable limits as established by the Owner's Representative, Local Issuing Authority and State.
- C. Temporary sedimentation controls include, but are not limited to, BMP's such as: silt fencing, silt dams, temporary sediment traps, temporary inlet sediment traps, barriers, rock filter dams, temporary creek crossings, diversion ditches, tree protection fencing, and appurtenances at the foot of sloped surfaces ensuring the sedimentation pollution will be either eliminated or maintained.
- D. Site restoration includes, but not limited to, protecting, preserving, and reestablishing specimen trees, fences, cultivated trees and shrubbery, and man-made improvements within and surrounding the project area.

1.02 RELATED SECTIONS

- A. Section 01015: Control of Work
- B. Section 02110: Access Route and Easement Access Clearing
- C. Section 02271: Gabions
- D. Section 02273: Riprap
- E. Section 02485: Sodding
- F. Section 02486: Seeding
- G. Section 02542: Silt Fence

1.03 REFERENCES

- A. Clean Water Act
- B. California Building Code

- C. Any Soil Erosion and Sediment Control Ordinances in force by the local Government.
- D. State of California, Department of Transportation, Standard Specifications.
- E. California Water Quality Control Act

1.04 QUALIFICATIONS AND REQUIREMENTS

- A. Provide effective temporary erosion and sediment control measures during construction or until final controls become effective.

1.05 SUBMITTALS

- A. Furnish manufacturer's data for all items confirming compliance with specifications
- B. Furnish qualifications of all personnel involved in Work related to providing, monitoring, maintaining and removing temporary erosion and sedimentation controls

PART 2 - PRODUCTS

2.01 EROSION CONTROL

- A. Mulch
- B. Temporary grass seed
- C. Permanent grass seed
- D. Sod
- E. Dust control
- F. Slope stabilization blankets
- G. Flocculants and coagulants
- H. Tackifiers
- I. Stream bank stabilization products
- J. Slope stabilization products:
 - 1. Rolled Erosion Control Products (RECPs): A natural fiber blanket with single or double photodegradable or biodegradable nets.

Blankets shall be non-toxic to vegetation, seed, or wildlife. At a minimum, the plastic or biodegradable netting shall be stitched to the fibrous matrix to maximize strength and provide for ease of handling.

- a. Products shall be determined to be non-toxic in accordance with EPA- 821-R-02-012.
2. Hydraulic Erosion Control Products (HECPs): shall utilize straw, cotton, wood or other natural based fibers held together by a soil binding agent working to stabilize soil particles. Paper mulch should not be used for erosion control.
 - a. HECPs shall be prepackaged from the manufacturer. Field mixing of performance enhancing additives will not be allowed. Fibrous components should be all natural or biodegradable.
 - b. Products shall be determined to be non-toxic in accordance with EPA- 821-R- 02-012.

2.02 SEDIMENTATION CONTROL

- A. Bales - clean, seed free cereal hay type.
- B. Netting - fabricated of material acceptable to the Owner.
- C. Filter stone - No. 57 - crushed stone.
- D. Filter media sock, silt fencing (Type NS or Type S). Tree save fencing.

PART 3 - EXECUTION

3.01 GENERAL

- A. All erosion control measures are to be installed per the requirement listed in the construction documents.
- B. No payment will be made for any portion of the Project when temporary erosion and sedimentation controls are not properly installed and maintained.

3.02 VEGETATIVE MEASURES

- A. Erosion control should be addressed in the planning stages of all proposed land- disturbing activities. Erosion control techniques shall be installed, monitored and maintained on all areas exposed, including areas that will be paved or built upon in the future. Various types of vegetative practices are to be used as required for erosion control. The time-line for the implementation of various vegetative practices is as follows:
- B. Mulch, temporary vegetation, or permanent (perennial) vegetation shall be completed on all exposed areas within 14 days after disturbance. Failure to do so will justify Owner to immediately have work done at the Contractor's expense.

- C. Ds1 - Disturbed Area Stabilization (With Mulching Only): Mulching can be used as a singular erosion control method on areas at rough grade. Mulch can be an option for up to six months provided the mulch is applied at the appropriate depth (depending on type of mulch used), anchored, and has a continuous 90% cover or greater of the soil surface. Maintenance shall be required to maintain appropriate depth, anchorage, and 90% cover. If an area will remain undisturbed for greater than six months, permanent (perennial) vegetation shall be used.
- D. Ds2 - Disturbed Area Stabilization (With Temporary Seeding): Temporary vegetation may be employed instead of mulch if the area will remain undisturbed for less than six months.
- E. Ds3 - Disturbed Area Stabilization (With Permanent Vegetation): Permanent (perennial) vegetation or sod shall be used immediately on areas at final grade. Permanent (perennial) vegetation shall be used on rough graded areas to remain undisturbed for six months or greater. Ds4 - Disturbed Area Stabilization (With Sodding): May be used in place of Ds3.
- F. Stabilization of an area is accomplished when 70% of the surface area is covered in a uniform, vegetative cover (permanent or temporary) or anchored mulch of the appropriate thickness with 90% coverage. "Final stabilization" means all soil disturbing activities at the site have been completed, and for unpaved areas and areas not covered by permanent structures and areas located outside the waste disposal limits of a landfill cell certified by EPD for waste disposal, 100% of the soil surface is uniformly covered in permanent vegetation with a density of 70% or greater, or landscaped according to the Plan (uniformly covered with landscaping materials in planned landscaped areas), or equivalent permanent stabilization measures.
- G. Permanent (perennial) vegetation shall consist of: planted trees, shrubs, perennial vines; a crop of perennial vegetation appropriate for the time of year and region; or a crop of annual vegetation and a seeding of target crop perennials appropriate for the region, such that within the growing season with a 70% coverage by perennial vegetation shall be achieved.
 - 1. For linear construction projects on land used for agricultural or silvicultural purposes, final stabilization may be accomplished by stabilizing the disturbed land for its agricultural or silvicultural use.
 - 2. For the purposes of this specification, permanent vegetation is used synonymously with perennial vegetation. Perennial vegetation is plant material that lives continuously from year to year although it may have a dormant season when the leaves and possibly the stems "die back" to the ground. No vegetative planting can technically be considered permanent. Annual vegetation is plant material lives for only one growing season. This type of vegetation is typically used for temporary establishment due to its quick germination. Some perennial vegetation can be used for temporary stabilization.
- H. Slope Stabilization
 - 1. It is the intention of this specification to allow interchangeable use of RECPs and HECs for erosion protection on slopes. The Contractor should select the type of erosion control product best fitting the need of the particular site.
 - a. Installation and stapling of RECPs and application rates for the HECs

shall conform to manufacturer's guidelines for application.

- b. Products shall have a maximum C-factor (ASTM D6459) for the following slope grade:

Slope (H:V)	C-Factor (max.)
3:1 or greater	0.080

2. RECPs will be categorized as follows:

- a. Short term (functional longevity 12 mos.)

- 1) Photodegradable: Straw blankets with a top and bottom side photo degradable net. The maximum size of the mesh shall be openings of ½" X ½". The blanket should be sewn together on 1.5" centers with degradable thread. Minimum thickness should be 0.35" and minimum density should be 0.5 lbs per square yard.
- 2) Biodegradable: Straw blanket with a top and bottom side biodegradable jute net. The top side net shall consist of machine direction strands that are twisted together and then interwoven with cross direction strands (leno weave). The bottom net may be leno weave or otherwise to meet requirements. The approximate size of the mesh shall be openings of 0.5" X 1.0". The blanket should be sewn together on 1.5" centers with degradable thread. Minimum thickness should be 0.25" and minimum density should be 0.5 lbs per square yard.

- b. Extended term (functional longevity 24 mos.)

- 1) Photodegradable: Blankets that consist of 70% straw and 30% coconut with a top and bottom side photodegradable net. The top net should have ultraviolet additives to delay breakdown. The maximum size of the mesh shall be openings of 0.65" X 0.65". The blanket should be sewn together on 1.5" centers with degradable thread. Minimum thickness should be 0.35" and minimum density should be 0.6 lbs. per square yard.
- 2) Biodegradable: Blankets that consist of 70% straw and 30% coconut with a top and bottom side biodegradable jute net. The top side net shall consist of machine direction strands that are twisted together and then interwoven with cross direction strands (leno weave). The bottom net may be leno weave or otherwise to meet requirements. The approximate size of the mesh shall be openings of 0.5" X 1.0". The blanket should be sewn together on 1.5" centers with degradable thread. Minimum thickness should be 0.25" and minimum density should be 0.65 lbs per square yard.

c. Long-term (functional longevity 36 mos.)

- 1) Photodegradable: Blankets that consist of 100% coconut with a top and bottom side photodegradable net. Each net should have ultraviolet additives to delay breakdown. The maximum size of the mesh shall be openings of 0.65" X 0.65". The blanket should be sewn together on 1.5" centers with degradable thread. Minimum thickness should be 0.3" and minimum density should be 0.5 lbs per square yard.
- 2) Biodegradable: Blankets that consist of 100% coconut with a top and bottom side biodegradable jute net. The top side net shall consist of machine direction strands that are twisted together and then interwoven with cross direction strands (leno weave). The bottom net may be leno weave or otherwise to meet requirements. The approximate size of the mesh shall be openings of 0.5" X 1.0". The blanket should be sewn together on 1.5" centers with degradable thread. Minimum thickness should be 0.25" and minimum density should be 0.5 lbs per square yard.
3. Site Preparation: After the site has been shaped and graded to the approved design, prepare a friable seedbed relatively free from clods and rocks more than one inch (1") in diameter, and any foreign material preventing contact of the soil stabilization mat with the soil surface. Surface must be smooth to ensure proper contact of blankets or matting to the soil surface. If necessary, redirect any runoff from the ditch or slope during installation.
4. Maintenance: All erosion control blankets and matting should be inspected periodically following installation, particularly after rainstorms to check for erosion and undermining. Any dislocation or failure should be repaired immediately. If washouts or breakage occurs, reinstall the material after repairing damage to the slope or ditch. Continue to monitor and maintain these areas until they become permanently stabilized.

3.03 SEDIMENTATION CONTROL

- A. Install and maintain silt fencing, silt dams, traps, barriers and all other appurtenances as shown on the approved descriptions and working drawings. Hay bales, silt fencing, filter socks, and other BMP's which deteriorate and filter stone which is dislodged shall be replaced when needed.
- B. Install and maintain temporary stream crossings as indicated in these specifications.

3.04 SITE RESTORATION

- A. Prior to clearing landscaping features, but not necessarily limited to, specimen trees, fences, cultivated trees, cultivated shrubbery, property corners, man-made improvements, subdivision and other signs, shall be noted and shall be reviewed with the Owner's Representative. The Owner's Representative will determine the landscape features to remain undisturbed. The Contractor shall take extreme care in moving landscape features and shall re-establish these features as directed by the Owner's Representative.
- B. Species of plantings to be replaced shall be verified by a landscape expert. The size of the planting replacement must be equal to the size of the planting removed.
- C. Fences adjoining any excavation or embankment, in the Contractor's opinion, damaged or buried, shall be carefully removed, stored and replaced. Any fencing, in the Owner's Representative opinion, damaged by lack of care shall be replaced with new fence material of equal or better quality at the Contractor's expense. If existing fence cannot be restored or new fence required by direction of the Owner, payment will constitute full compensation for removing and replacing chain link or wooden fence, in kind, on public or private property in accordance with Section 02776.
- D. The Contractor shall exercise special precautions for protecting and preserving trees, cultivated shrubs, sod, fences, etc. situated within limits of the project area. The Contractor shall be held liable for any damage his operations have inflicted on such property.
- E. The Contractor shall be responsible for all damages to existing improvements outside the project area resulting from Contractor's operations.

3.05 ACCEPTANCE

- A. Should any of the temporary erosion and sediment control measures employed fail to produce results complying with the requirements of the State, immediately take whatever steps are necessary to correct the deficiency within the limits defined in the NPDES permit.
- B. For a product or practice to be approved as slope stabilization, the product or practice must have a documented C-factor of 0.080.

3.06 DOCUMENTATION

- A. Contractor shall monitor report and retain records as required by the GA NPDES Permit No. GAR 100001, 100002, or 100003, as applicable. Attached to the end of this section are the minimal, but not limited to, reports which should be performed and maintained. The following are the attached sample reports:
 - 1. Daily Inspection Report
 - 2. Daily Rainfall Log
 - 3. Weekly Inspection Report
 - 4. Stormwater Log

5. Monthly Inspection Report
6. Inspection Summary Report (for violations and corrective actions)
7. Erosion and Sedimentation Control Inspection Report

END OF SECTION

SECTION 02400

SHEETING, SHORING, AND BRACING

PART 1: GENERAL

1.01 DESCRIPTION

The work of this section covers protective installations consisting of shores, wales, braces, posts, piling, sheeting, anchorages and fastenings required for the work of this project.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02140: Dewatering
- B. Section 02225: Structure Excavation and Backfill
- C. Section 02221: Utility Trenching and Backfilling

1.03 QUALITY ASSURANCE

Design Criteria. Contractor shall design and construct temporary sheeting, shoring, and cofferdams, which are to be used as an aid in construction. Design shall be prepared in conformance with applicable requirements of Article 6, "Excavations, Trenches, Earthwork" of Construction Safety Orders of California State Division of Occupational Health and Safety. In addition, sheet piling design shall be based on the material requirements specified herein. Sloping of excavations shall not be employed below the groundwater or maximum aqueduct water elevation. Designs shall be prepared and signed by a Civil Engineer registered in the State of California and shall be based on the stresses for various materials of construction contained in the Uniform Building Code 1994 Edition and latest supplement. The allowable stresses permitted by the Uniform Building Code may be increased 15 percent for temporary shoring used as an aid to construction.

1.04 SUBMITTALS

- A. Submit to the Engineer for record purposes copies of the drawings and calculations used to determine the strength, size, and stability of the protective installations. All designs submitted under this section shall be signed by a Structural or Civil Engineer duly registered in the State of California.
- B. Prior to the start of any work involving sheeting and bracing, the Contractor shall obtain a valid excavation permit from the Cal OSHA District office. A copy of the permit and all accompanying drawings, data, and calculations shall be submitted to the Engineer for record purposes only and not for review or approval.

1.05 ALTERNATIVES

The use or application of alternative methods and materials, and the employment of propriety systems under lease or franchise in lieu of that specified herein, may be allowed. Demonstration of suitability and compliance with these specifications and approval of the Owner shall be required.

PART 2: PRODUCTS

2.01 MATERIALS

A. Lumber

Temporary Shores, Wales, and Sheeting. Furnish structural grade planks, beams, and posts as defined and specified for stress-grade lumber in the American Lumber Standards. Lumber may be rough, untreated, in random lengths, and shall be of standard dimensions.

B. Sheet Piling

1. *Material.* Sheet pile shall be manufactured from steel conforming to ASTM A-328, or from steel conforming to ASTM A-572, grade 42.
2. *Dimensions and Section Properties.* Steel sheet piling used for cofferdams or trench sheeting shall be standard rolled sections PZ, PDA, PSA, or PS. The weight, dimensions and section properties shall be appropriate for the intended use, as demonstrated by the design.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. General. Install sheeting and bracing for trench and structure excavation as the work requires. Butt planks to and/or interlock sheets to exclude groundwater and fines, preventing the erosion of voids outside sheeting. In soft, wet ground drive sheeting to a lower level as excavation progresses so that sheeting is embedded in undisturbed earth. Bracing of sheet piling may be permitted to penetrate the structural concrete only as approved by the Engineer. Refer to Section 03100. Install wales and struts at close intervals so as to prevent displacement of the surrounding earth and to maintain safe conditions in the work area. Any damage proven to result from improper installation shall be the responsibility of the Contractor.

Temporary sheeting for trench and structure excavation may be removed and re-used. Withdraw individual planks alternatively as the backfill is raised, maintaining sufficient sheeting and bracing to protect the work and workmen. Remove bracing completely. Where unstable conditions occur in the underlying strata from any cause, and withdrawal of sheeting will endanger the work, a portion of the sheeting, including bracing, may be left in place with approval of the Owner. Remove all wood within a zone extending to four (4) feet below finished grade. Leaving such material in place shall not be cause of an increase in Contract price.

- B. Sheet Piling: The Contractor has the option of using steel sheet piling for temporary protective installations. All piping installations shall be continuous.
1. *Installation of Sheet Piling.* Depth of piling shall be sufficient to prevent heave when the trench is dewatered. Piles shall be driven with a hammer with an adequate capacity to complete pile driving without changing hammers. The use of air or water jets to assist in driving the sheet piling will be permitted, providing

that the last 5 feet of advance is by driving. Piles shall be driven accurately to the lines and grades shown or required, with each section interlocked with the sheet piles driven previously. To ensure proper alignment of the sheet piles, a driving template or jig shall be used. If any pile is damaged during driving, it shall be removed and replaced. If piles are driven out of interlock or are not properly plumbed or aligned, the piles shall be pulled and re-driven.

2. *Prevention of Damage.* In installing, cutting off, or removing sheet piles, every precaution shall be taken to ensure that damage to the structure or pipeline does not occur. If damage does occur, the Contractor shall perform the necessary repairs at his own expense.

3.02 PROTECTION OF EXISTING FACILITIES

It is the Contractor's responsibility to protect existing facilities from the consequences of his work. Where any sloped excavation infringes on or potentially endangers any existing facilities or structures, provide shoring, sheeting, and bracing according to shop drawings and calculations signed and stamped by a structural or civil engineer registered in the State of California.

END OF SECTION

SECTION 02500

LINING WITH CURED-IN-PLACE PIPE (CIPP)

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. The rehabilitation of a full length of an existing sewer main, from manhole to manhole, and partial/segmental/point repairs by the trenchless method known as Cured-In-Place Pipe (CIPP) lining.
 - 1. CIPP consists of:
 - a. Installing a resin-impregnated flexible tube, either inverted or pulled into the existing sewer main,
 - b. Expanding the tube to fit tightly against the interior diameter of the main it was installed in by the use of water or air pressure.
 - c. Curing/hardening the resin by elevating the temperature of the fluid (water/air) used for the inflation to a sufficient level for the initiators in the resin to effect a reaction.
 - d. The resultant shall be a hard, impermeable pipe within a pipe.
 - 2. Partial/segmental/point repair CIPP shall include lining a limited section of pipe of no less than three (3) linear feet in length or longer

1.02 SCOPE

- A. Provide all material, labor, and equipment to rehabilitate the existing sanitary sewer as described herein and shown on the plans.
- B. The CIPP process shall provide for the structural and hydraulic renewal of the existing sewer.
 - 1. The CIPP liner shall be smooth, hard, strong and chemically inert.
 - 2. The interior surface shall closely follow the contours of the host pipe.
- C. When completed:
 - 1. Re-establish access at manholes
 - a. Seal at each manhole shall be watertight.

2. New CIPP liner shall extend from manhole to manhole
3. Re-establish service connections to the sewer. Produce a seal that eliminates infiltration with an epoxy or resin mixture compatible with the liner resin system. Seal shall be water tight.

1.03 REFERENCES

A. ASTM

1. D543 – Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents
2. D638 - Standard Test Method for Tensile Properties of Plastics. D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
3. D1598 - Standard Test Method for Time-to-Failure of Plastic Pipe Under Constant Internal Pressure.
4. D2122 - Standard Test Method for Determining Dimensions of Thermoplastic Pipe and Fittings.
5. D2990 - Standard Test Methods for Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics.
6. D2412 - Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.
7. D2837 - Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials or Pressure Design Basis for Thermoplastic Pipe Products.
8. D5813 - Standard Specification for Cured-In-Place Thermosetting Resin Sewer Piping Systems.
9. F1216 - Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube.
10. F1743 - Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe.
11. F2019- Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Pulled in Place Installation of Glass Reinforced Plastic (GRP) Cured- in-Place Thermosetting Resin Pipe.
12. F2599 – Standard Practice for the Sectional Repair of Damaged Pipe by Means of an Inverted Cured-In-Place Liner

- B. National Association of Sewer Service Companies (NASSCO): Guideline for the use and handling of styrenated resins in cured-in-place-pipe, September, 2008

1.04 QUALIFICATION REQUIREMENTS

A. Product manufacturer shall have:

1. Minimum 10 years' experience in CIPP manufacturing including:
 - a. Manufacture of a minimum of 100,000 linear feet of CIPP
 - b. References for 10 projects for CIPP with pipe diameters of similar size or greater to those found on the contract drawings
 - c. Personal experience of the manufacturing manager with other manufacturing companies may be substituted in lieu of the current company experience
 - d. Product is designed for a minimum 50-year design life.

B. Installing Contractor shall have:

1. Minimum of 5 years' experience in sewer rehabilitation including:
 - a. Minimum 30,000 linear feet of sewer rehabilitation
 1. In pipe diameter of similar size to those found on the contract drawings or greater utilizing CIPP trenchless technology.
 - b. Personal experience of the Contractor's construction manager with other construction companies may be substituted in lieu of the current company experience
 1. Substitution after award requires approval of Owner's Representative.
 - c. Contractor's Installing Personnel (Superintendent and foreman) must have:
 1. Minimum 3 years active experience in commercial installation of CIPP liner
 2. Key personnel shall each have completed minimum 30,000 linear feet and 100 line sections of CIPP in gravity sewers.
 3. Certified training on installing manufacturer's product approved by the manufacturer.
2. Demonstrate they have a manufacturer approved quality assurance program to standardize the materials, manufacture, wet out and installation of the specific CIPP product in place.

1.05 SUBMITTALS

A. Action Submittals (submit for review and approval):

1. Comprehensive Construction Sequencing Plan including:

- a. Work Site Plan including:
 - 1) Proposed access routes
 - 2) Set up locations for lining installation
 - 3) Wet out area (if required) including:
 - a) Typical insertion and curing schedule/plan
 - (1) Submit wet out, insertion and curing plan for each and every lining proposed
 - (a) Submit minimum 48 hours (2 working days) prior to each installation
 - b. Site Health and Safety Plan
 - c. Required Construction Permits
 - d. Work schedule
2. Erosion Control Plan in accordance with Section 02276 Site Restoration and Erosion Control.
 3. Traffic Control Plan in accordance with CalTrans requirements (where applicable).
 4. Analysis of design criteria and calculations for CIPP thickness per ASTM F1216 full deteriorated condition.
 - a. Submit complete data and design calculations for each lining
 - b. Include installation method statement for each lining including:
 - 1) Repair details for potential sewer defects in conjunction with manholes, joints, laterals and infiltration.
 - 2) Quality Control/Quality Assurances
 - c. Calculations shall be prepared and stamped by a Professional Engineer in the State of California.
 - 1) Approval of the calculations shall not relieve the Contractor of any contractual obligations.
 5. Curing temperature monitoring system shop drawings
 6. Shop drawings for hydrophilic end seals and pre-liners to be used and method of installation.
 7. Proposed testing procedure including: number, location and sampling methods.
 8. Proposed testing laboratory with qualifications, experience history and references.

9. Pre-installation CCTV inspection DVD.
10. Qualification requirements for the Contractor, Installer and personnel (See Item 1.04 Qualifications, this specification)

B. Informational Submittals:

1. Manufacturer's technical literature and certificate demonstrating the materialsto be used meet the referenced standards and the requirements of these specifications.
2. Proposed equipment and procedures for accomplishing the cured-in-place pipe lining work.
3. Manufacturer's printed installation instructions including:
 - a. Installation method statement including:
 - 1) Details concerning curing methods,
 - 2) Inversion pressures necessary for proper installation,
 - 3) Minimum pressure required to hold tube tight against existing hostpipe,
 - 4) Maximum allowable pressure that will not damage tube,
 - 5) Type of insertion,
 - 6) Defect repair:
 - a) Methods of repairing in conjunction with manholes,
 - b) Joints,
 - c) Laterals,
 - d) Active infiltration,
 - e) Quality control/quality assurance plan,
 - f) Repair material test results.
4. Product data and Manufacturer's installation procedures for resin and catalyst system including but not limited to specifications, characteristics, properties, and itemized exceptions and deviations to Specification.
5. Certified test reports on physical properties and chemical resistance of proposed resin
6. Material Safety Data Sheets for all resins, and other additives such as accelerants, colorants, and lubricants utilized in the pipe liner/lining process.
7. Manufacturer's Certificate of Compliance that resin material is appropriate for intended application and in conformance with specifications
8. Certified test reports on physical properties and chemical resistance of proposed resin

9. Annular space sealant
10. Service connection fittings

C. Project Submittals

1. The Contractor shall submit the following information during the project for the use of CIPP at a particular location:
 - a. Field measurements.
 - b. Design wall thickness calculations,
 - 1) Signed and sealed by a professional engineer registered in the state of California and proficient in the design of CIPP systems.
 - 2) Manufacturer certification of material of CIPP systems.
 - 3) Manufacturer certification of material to values used in calculations.
2. “Wet-out” Plan: for each proposed lining section:
 - a. method for “wet-out” or flexible tube
 - b. specific insertion and curing schedule
3. Contractor’s procedures and materials for installing the liner and renewing sewer services including time and duration of sewer service unavailability.
4. Sampling procedures and locations for obtaining representative samples of the finished liner.

D. The Contractor shall submit a daily written record as specified in Section 01320 Progress Reports & Videos

1. The Owner’s Representative shall certify receipt of the daily record (in email format) noting any items and adding any observations with reference to claims for payment to the Contractor.
2. The Owner’s Representative may request a weekly submission in the form of progress report.
 - a. Owner’s Representative shall provide the Contractor a written request for a weekly progress report.

E. Record drawings, including the identification of the work completed by the Contractor, and the post-installation CCTV shall be submitted within 2 weeks after the project is completed.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Packaging, handling and shipping shall be done in accordance with the manufacturer’s instructions.

1. The Contractor shall be responsible for the delivery, storage, and handling of materials and products.
 - a. keep products safe from damage
 - b. Promptly remove damaged products from the Work site at the Contractor's expense.
 - c. Replace damaged products with undamaged products acceptable to the Manufacturer and Owner's Representative.
 - d. Dispose of in accordance with current applicable regulations.
 2. No materials or products shall be shipped to the Site of the Work without the agreement of the Owner's Representative.
- B. Resin to be shipped directly to wet-out facility from resin manufacturer unless otherwise approved by the Owner's Representative.
- C. Store water or steam cured resin-impregnated tubes in refrigerated truck trailers at a temperature below 45 degrees F to prevent premature curing.
- D. No cuts, tears, or abrasions shall occur to liner tube.
- E. No cuts, tears, or abrasions shall occur to liner tube during handling.
- F. Materials shall be accompanied by test reports certifying that the material conforms to the ASTM standards listed herein.
- G. The liner wet-out report must be provided for liner material and resin type.
1. The ratio of resin and fabric must be provided by the manufacturer.

1.07 SAFETY

- A. Perform work in accordance with CAL OSHA standards and State and Federal safety regulations.
- B. No confined space entry will be permitted without the development and implementation of a confined space entry plan:
 1. Plan shall be in accordance with CAL OSHA standards
 2. Personnel involved shall have current training certificates
 3. Entry permit is required prior to entry.

PART 2 - GENERAL

2.01 PRODUCTS

- A. Liner pipe shall be cured-in-place pipe (CIPP) similar or equal to the following:

1. Insituform, St., Louis, MO.
 2. Granite Inliner, Orleans, IN (formerly Layne Inliner).
 3. IPR, The Woodlands, TX.
 4. Other proposed liner products must be preapproved by the Owner's Representative.
- B. Owner or Owner's Representative shall be entitled to witness the pipe manufacture.

2.02 MATERIALS

- A. Flexible Liner Tube:
1. Consist of layers of flexible nonwoven and absorbent polyester felt:
 - a. Designed in accordance with ASTM F1216, Appendix X.1.2.2 (Fully Deteriorated Gravity Pipe Condition).
 - b. CIPP design shall assume no bonding to the original pipe wall.
 - c. Fabricated from materials which when cured will be chemically resistant to reagents as defined in ASTM D543.
 2. Manufacturer must have performed long-term testing for flexural creep of the CIP material installed by Subcontractors.
 - a. Such testing results are to be used to determine the long-term, time dependent flexural modulus that will be used in product design.
 - 1) This constitutes a performance test of the tube and resin and general installation and curing workmanship.
 - b. A percentage of the instantaneous used in design calculations for exterior buckling.
 - c. A percentage of the instantaneous flexural modulus value will be used in design
 - 1) The percentage or the long-term creep retention value utilized will be verified by this testing.
 - 2) Retention values exceeding 50 percent of the short-term test results will not be allowed.
 - d. Materials used shall be of a quality equal to, or better than, the materials used in the long-term test with respect to the initial flexural modulus used in the CIPP design.
 3. Layers of cured CIPP shall be uniformly bonded.
 - a. Layers that separate cleanly using a probe or point of a knife blade are not acceptable.
 - b. Probe or knife blade moving cleanly between layers is not acceptable.

- c. Occurrence of (a) or (b) above will require new samples to be obtained from the installed pipe.
 - d. Reoccurrence may cause rejection of the Work.
 - e. Overlapped layers of felt in longitudinal seams that cause lumps in the final product are not acceptable.
4. Capable of stretching to fit irregular pipe sections.
5. Fabricated and sized for each section to ensure snug and firm fit inside existing sewer
 - a. Produce required thickness after resin is cured.
 - b. After installation there shall be no wrinkles or permanent fins formed.
6. Inside layer of tube shall be coated with an impermeable material compatible with resin and felt.
7. Maximum Stretching Allowance: In accordance with ASTM F1216.
8. Fabricate in lengths such that liner occupies length of pipeline between launch and reception manholes.
9. Where several layers of felt are required, inner layer shall be stitched to form a tube.
 - a. Each successive layer shall be individually wrapped around previous one and stitched together.
 - b. Outer layer of felt shall have an installation tube pre-bonded to it, or a sheet of this material shall be wrapped around completed felt tube.
 - 1) Where a pre-bonded material is used, bond a covering strip over seam to form airtight joint.
- B. Pre-liner:
 1. Polypropylene compatible with resin system used for the CIPP:
 - a. Shall not adversely affect adhesive properties of resin used in mainline or lateral liners.
 - b. May be used (if required) to eliminate/control infiltration during CIPP installation.
- C. Interior Pipe Wall Color: Shall not be a dark or non-reflective nature that could inhibit proper closed-circuit television (CCTV) inspection.
- D. Prior to design and manufacture of the liner,
 1. Obtain all the information needed for to be provided for design including:
 - a. condition of the host pipe,
 - b. Host pipe:
 - 1) Diameter,
 - 2) Ovality,

- 3) Deflection,
- 4) Length
- 5) Bury conditions,
- 6) Soil type,
- 7) Soil loading factor
- 8) Hydrostatic load,

E. Design liner thickness using the following criteria:

- 1. Design Life: 50 Years
- 2. Pipe Diameters: Per Contract Drawings
- 3. Ovality: 2%
- 4. Pipe Condition: Fully deteriorated
- 5. External Water: Ground surface if not specified on the Contract Drawings
- 6. Flexural Strength: 4,500 psi
- 7. Short Term Flexural Modulus: 250,000 psi
- 8. Reduction Factor: 50%
- 9. Long Term Flexural Modules: 125,000 psi
- 10. k Enhancement Factor: 7.
- 11. Soil Modules: 1,000 psi
- 12. Soil Density: 125 pcf
- 13. Highway Live Load: AASHTO H-25
- 14. Safety Factor: 2 minimum
- 15. Minimum Thickness- The liner thickness of each pipe segment shall be determined by the Contractor and submitted per Paragraph 1.05 of this Section. The minimum CIPP design thicknesses are listed below.

6" – 10" Dia	6 mm
12"-15" Dia	7.5 mm
18" Dia.	9 mm
21" Dia	10.5 mm
24" Dia.	12 mm

- a. If calculations require thicker wall, round to next higher multiple of 0.5 millimeters.

- 16. Poisson's Ratio: 0.3

17. Minimum length Partial/Segmental/Point Repair liners to be 8 feet. Repair shall effectively span the distance from the adjacent pipe joint plus one (1) foot unless otherwise directed by the Owner's Representative
 - a. Calculated lengths longer than 8 feet will govern.
18. Liner shall be watertight
19. Produce cured tube resistant to shrinkage, not corrode or oxidize, and resistant to abrasion from solids, grit, and sand in wastewater.

2.03 RESIN

A. Resin:

1. Corrosion-resistant polyester, vinyl ester or epoxy system including all required catalysts, initiators or hardeners.
 - a. When cured within the tube create a composite that satisfies the requirements of ASTM F1216 and ASTM F1743.
 - b. The physical properties specified herein and those which are to be utilized in the design of the CIPP for this Project.
2. Shall produce a CIPP that will comply with the structural and chemical resistance requirements of this Specification.
 - a. Styrenated resins are allowed. General purpose, unsaturated, polyester, epoxy, isophthalic neopentyl glycol, or thermosetting vinyl ester resin, catalyst system, initiators, or hardeners that provide specified cured physical strengths and properties, and
3. Compatible with reconstruction inversion process.
4. Resin used for a partial/segmental/point repair:
 - a. Epoxy resin providing the specified cured physical strengths and properties.
 - b. Compatible with reconstruction inversion process
 - c. Unless otherwise directed by the Owner's Representative.
5. Resistant to municipal wastewater environment including:
 - a. Immersion in raw septic sewage at temperatures up to 75 degrees F.
6. Curing:
 - a. Designed to cure properly within selected curing method.
 - b. Initiation Temperature: 180 degrees F, maximum.

7. Resistant to ultra-violet light (sunlight) prior to installation.
8. Only neat resins are acceptable.
 - a. PET resins, resin filters, resin additives, and resin enhancement agents are prohibited.
 - b. Old resins and reworked resins are prohibited,
 - 1) Regardless of whether or not they are mixed with new resin.
9. Chemical resistance of resin system shall have been tested by resin manufacturer in accordance with ASTM D543.
 - a. Exposure to chemical solutions listed below at temperatures of up to 75 degrees F shall be conducted for a minimum period of 1 month
 - 1) Resulting in a loss of not more than 20 percent of initial structural properties.
 - b. Minimum Chemical Solution Concentration, ASTM F1216:
 - 1) Tap Water, pH 6 to 9: 100 percent.
 - 2) Nitric Acid: 5 percent.
 - 3) Phosphoric Acid: 10 percent.
 - 4) Sulfuric Acid: 10 percent.
 - 5) Gasoline: 100 percent.
 - 6) Vegetable Oil: 100 percent.
 - 7) Detergent or Soap: 0.1 percent.
 - c. CIPP samples for testing shall be of tube and resin system similar to that proposed for actual construction.
 - 1) CIPP samples with and without plastic coating shall meet these chemical testing requirements.
10. CIPP Field Samples:
 - a. Submit test results from field installations of the same resin system and tub materials as proposed for the actual installation.
 - b. Test results must verify that CIPP physical properties specified have been achieved in previous field applications.

B. Catalyst:

1. Primary: 1 percent maximum of resin by volume.
2. Secondary: 1/2 percent maximum of resin by volume.

C. Hydrophilic End Seals

1. Hydrotite, Greenstreak, Inc.
2. Ultra Seal, Adeka Corporation.
3. Insignia, LMK Technologies

2.04 SOURCE QUALITY CONTROL

- A. At time of manufacture, each lot of liner shall be inspected and certified to be free of defects.
- B. Mark inside of tube in at least one location per setup.
 1. Mark shall include manufacturer of liner, at regular intervals, not to exceed 5 feet, along full length.

PART 3 - EXECUTION

3.01 PREPARATION

- A. The following installation procedures shall be adhered to unless otherwise approved by the Owner's Representative.
 1. Carry out all operations in accordance with Federal, State, and local safety laws, regulations, standards, policies, and procedures including those promulgated by CAL OSHA and those recommended by the manufacturer.
 - a. Particular attention is drawn to those safety requirements involving entering confined spaces (follow CAL OSHA requirements) and steam curing.
 - 1) Curing with pressurized steam creates additional safety concerns including:
 - a) High temperatures,
 - b) Quick burn times,
 - c) Potential blow offs,
 - d) Others.
 - 2) take additional precautions to secure the work area
 - a) Insure the safety of everyone in or around the curing apparatus.
 - 3) Before utilizing this curing method:
 - a) Submit a written copy of the Contractor's standard operating and safety procedures for this methodology to the Owner's Representative.
 - b) Submittal to go to the Owner's Representative
 - c) Address all safety concerns in the submittal

- d) Identify how/where CAL OSHA requirements are addressed in the submitted procedures.
 2. The Contractor shall bypass wastewater around the sewer segment or sewer segments designated for lining as specified in Section 01520 –Sewer Flow Control.
 - a. Bypass system shall include accommodating flow from mainlines and service laterals as required
 - b. Service connection effluent (laterals) may be plugged only after proper notification to the affected properties.
 - c. The Contractor is responsible for any overflows that occur due to his operations.
 - 1) Damage/cleanup shall be completed by the Contractor at no additional expense to the project.
 3. Do not install liner if ground water temperatures and/or ambient temperatures are excessive for the manufacturer's recommended installation procedures.
- B. Where practicable, liners may be installed in continuous runs through manholes where there are two or more continuous sewer segments, especially to connect several short segments with a continuous lining.
 1. Furnish a detailed traffic control plan and all labor and equipment necessary if required to complete installation.
 2. No separate payment will be made for traffic control. It is an incidental part for CIPP installation.

3.02 PRE-INSTALLATION PROCEDURES

- A. Locate and designate all existing manholes and new manhole access points as necessary for the Work.
 1. Provide water from hydrants for cleaning, installation and other process related work items requiring water.
 - a. Comply with all connection and use requirements for water.
 - b. Use clean water for inversion and curing.
 - c. Water procurement shall be in accordance with purveyor's requirements.
 2. Locate and mark all existing utilities in areas where excavation is to be performed prior to beginning any excavation.
- B. Complete the following activities:
 1. Before Work commences:

- a. Required pre-installation submittals shall be approved by Owner's Representative, including:
 - 1) Traffic management plan/measures,
 - 2) Safe pedestrian passage,
 - 3) Provision of vehicular access to property,
 - 4) Bypass/diversion pumping,
 - 5) Emergency measures/contingent plans.
 - b. Submit an Installation Access Plan including:
 - 1) Access manhole location(s)
 - 2) Site plan sketch showing dimensions of access within work limits and utilities
 - 3) Approximate installation rate (ft/day)
 - 4) Appropriate excavation/backfill/resurfacing procedures including permits according to CalTrans and governing agency standards.
2. Pre-insertion Cleaning:
 - a. Clean sewer pipe before pre-insertion television inspection.
 - 1) Immediately before installation of the lining complete a high pressure flush and vacuum in sewer sections to be rehabilitated and repaired including pertinent manholes.
 - 2) Remove any root, grease buildup and any other obstruction that may interfere with the lining operation.
 - b. Debris removed from sewer during cleaning shall be transported in water tight containers and disposed of in accordance with local, State, and Federal Regulations.
3. Pre-insertion CCTV Inspection:
 - a. In accordance with Section 01510 Sanitary Sewer Main Television and Sonar Inspection (CCTV)
 - b. Inspect sewer pipe before insertion of resin impregnated tube to ensure pipe is clean and existing pipe conditions are acceptable for lining.
 - 1) Any notable condition that could affect the lining operation will be removed/repared prior to initiating the lining.
 - c. Line Obstructions: If pre-insertion CCTV inspection reveals obstruction in existing pipe that cannot be removed by sewer cleaning equipment, with approval of Owner's Representative, perform point repair using flexible coupling.
4. Ensure proper sequence of work occurs between mainline and lateral lining activities.
5. Confirm accurate location and serviceability of existing lateral or service connection (tap). Serviceability shall be confirmed by flowing water, dye testing, or visually with CCTV inspection.

- a. Dye Testing: Where sewer line segments may contain abandoned services, Contractor may be directed by Program Manager to perform dye testing to determine if services are live and require reinstatement.
- b. When service connections protrude into existing pipe more than 1/2 inch, as measured from inside pipe wall, remove protruding portion of service connection to within 1/2 inch of inside pipe wall.

3.03 INSTALLATION

- A. Verify diameters and lengths in field before manufacturing and cutting liner to length
- B. Install in accordance with ASTM F1216, Section 7 or ASTM F1743, Section 6.
 - 1. Active infiltration must be removed prior to insertion of the liner.
- C. Resin Impregnation (Wet-Out):
 - 1. Quantity of resin used for tube impregnation shall be sufficient to fill the volume of air voids in the tube with additional allowances for:
 - a. Polymerization shrinkage
 - b. Loss of resin during installation through cracks and irregularities in the original pipe wall.
 - 2. Tube shall be vacuum impregnated with resin (wet-out) under controlled conditions.
 - a. Designate vacuum-impregnated location prior to CIPP installation
 - b. If requested, allow Owner's Representative to inspect materials and procedures used to vacuum impregnate tube.
 - c. The point of vacuum shall be no further than 25 feet from the point of initial resin introduction.
 - 1) After vacuum in the tube is established, a vacuum point shall be no further than 75 feet from the leading edge of the resin.
 - 2) The leading edge of the resin slug shall be as near to perpendicular to the longitudinal axis of the tube as possible.
 - d. If Contractor uses an alternative method of resin impregnation, method shall produce the equivalent results of a roller system.
 - 1) Proposed alternative shall be documented to Owner's Representative's and Program Manager's satisfaction that saturation of CIPP is sufficient.
 - e. Handle resin impregnated tube to retard or prevent settling until it is ready for insertion.
 - 3. Use roller system to uniformly distribute resin throughout tube.

4. Complete wet-out process control sheet for every lining completed. Control sheet shall provide the following information:
 - a. Liner manufacturer
 - b. Liner diameter
 - c. Number of layers
 - d. Resin manufacturer
 - e. Resin amount
 - f. Resin type
 - g. Batch number
 - h. Catalyst and accelerator name/type
 - i. Hardener name/type
 - j. Percent of filler, if any
 - k. Mixing ratios
 - l. Vacuum pressure of impregnation process
 - m. Wet-out start time and date

D. Insertion

1. Dewater existing host pipe for CIPP installation as required.
2. Insert wet-out tube through existing manhole or approved access point by means of an inversion process and application of hydrostatic head sufficient to extend tube to next designated manhole or termination point.
 - a. Alternately, tube may be pulled into place and expanded with inflation bladder.
 - 1) Insertion method shall not result in abrasion or scuffing of the tube.
3. Once installation has begun, maintain pressure between minimum and maximum pressures until installation has been completed.
 - a. Pressure shall be sufficient to hold tube tight against host sewer pipe.
4. Place temperature gauges between tube and host pipe's invert position to monitor temperature during cure cycle. VeriCure monitors are to be used when requested by Owner or Owner's Representative.
5. CIPP shall be continuous over entire length from manhole to manhole.
6. Complete installation process control sheet for every lining completed. Control sheet shall provide the following information:
 - a. Liner length.

- b. Hydrostatic head at point of inversion.
 - c. Hydrostatic head at termination point.
 - d. Time inversion process started.
 - e. Time cutting ends started.
 - f. Time cutting laterals started.
 - g. Number of laterals cut.
- E. Inflation Bladder Removal: For pulled-in-place installation techniques where inflation bladder is designed not to bond to CIPP, remove bladder material from CIPP
- F. Curing:
 - 1. Complete curing process control sheet for every lining completed.
 - 2. Control sheets shall provide (as outlined in ASTM F1216):
 - a. Include manufacture recommended temperatures and time for the different steps of curing process;
 - b. Initial cure,
 - 1) Initial cure may be considered completed when exposed portions of flexible tube pipe take a hard set and temperature is adequate
 - c. Post cure,
 - d. Cooling
 - 3. After installation, apply steam, or hot water as recommended by liner manufacturer.
 - a. Steam:
 - 1) Provide safety system specifically structured for use of steam.
 - 2) Thermoset Resin: Designed to cure properly when using steam.
 - 3) CIPP Tube Thermoplastic Coating:
 - a) Formulated from material designed specifically to with stand high temperature curing process utilizing steam.
 - b) Polypropylene/polyethylene blend or equal.
 - 4) Equipment:
 - a) Heat source shall be capable of delivering steam throughout section and uniformly raising steam temperature above temperature required to affect cure of resin.
 - b) Install temperature gauges in the following areas:

- (1) Incoming steam supply.
 - (a) Outgoing steam supply.
 - (2) Between impregnated tube and pipe invert at lining termination point.
 - (3) VeriCure monitors are to be used when requested by Owner or Owner's Representative.
- 5) Steam Temperature: 230 degrees F, minimum.
- 6) Minimum Interface Temperature between Liner and Tube: 120 degrees F.
- 7) Pressure Required to Keep Tube Inflated: Per manufacturer's instructions.
- 8) Time: Per manufacturer's instructions.
- 9) Cool Down:
 - a) Send air through steam cured CIPP liner until liner cools down to 120 degrees F interface temperature.
 - b) Once 120 degrees F has been reached, water may be introduced to finish cooling line down to 90 degrees F.
 - c) During release of water, prevent vacuum that could damage newly installed CIPP.
- b. Hot Water:
 - 1) Provide safety system specifically structured for use of hot water.
 - 2) Thermoset Resin: Designed to cure properly when using hot water.
 - 3) CIPP Tube Thermoplastic Coating:
 - a) Formulated from material designed specifically to withstand high temperature curing process utilizing hot water.
 - b) Polypropylene/polyethylene blend or equal.
 - 4) Equipment:
 - a) Heat source shall be capable of delivering hot water throughout section and uniformly raising water temperature above temperature required to affect cure of resin.
 - b) Install temperature gauges in the following areas:
 - (1) Incoming water supply.
 - (2) Outgoing water supply.

- (3) Between impregnated tube and pipe invert at lining termination point.
- 5) VeriCure monitors are to be used when requested by Owner or Owner's Representative. Minimum Interface Temperature between Liner and Tube: 120 degrees F.
- 6) Time: 3 hours, minimum.
- 7) Cool Down:
 - a) Introduce cool water into CIPP to replace water being drained from small hole made in downstream end.
 - b) Cool liner to temperature below 90 degrees F before relieving hydrostatic head.
 - c) During release of water, prevent vacuum that could damage newly installed CIPP.

G. Manholes

1. CIPP terminating in manhole shall be cut in shape and manner approved by Owner's Representative.
2. Seal pipe opening and fill in annular space using products specified in Part 2 Products – Hydrophilic End Seals
 - a. CIPP connections at manhole opening shall be watertight seal.
 - b. Install seal per manufacturer's instructions.
 - c. Recheck seal repair after 48 hours. If seal does not hold, continue to repair until there are no leaks.
 - d. Channels: When CIPP is installed continuous through manhole create channel per Owner's Representative's Instructions. Do not beak or shear pipe.

H. Inverts:

1. Finish manhole inverts to provide smooth transition between connections.
2. Use CIPP liner material, an approved epoxy, or similar material to form smooth transition to eliminate sharp edges of CIPP, within host pipe, and in manholes at concrete bench and channel invert.
3. Invert rehabilitation shall be compatible with manhole rehabilitation activities.

I. Partial/Segmental/Point Repair CIPP Liners

1. Install partial CIPP liner in accordance with ASTM F2599 and same requirements for full liner.
2. Dimensions of liner shall be fabricated to size, that when installed, will neatly fit circumference of existing pipe.

3. Tube shall be vacuum impregnated with thermo-set resin.
 - a. Remove air in tube by vacuum allowing resin to thoroughly impregnate tube.
 - b. Retain a resin-impregnated sample of each installation to provide verification of curing process taking place in host pipe.
 - 1) Hang sample in entry manhole to simulate ambient conditions of host pipe.
4. Insert saturated tube and inversion bladder into carrying device and pull into host pipe.
 - a. Pull shall be completed when end of launching device is aligned with beginning of section to be repaired.
 - b. Protect resin and tube during pull to ensure no resin is lost by contact with manhole walls or pipe.
 - 1) Resin that provides structural seal shall not contact pipe until positioned at point of repair.
 - c. Alternative methods of liner insertion and pressurization may be used for products and processes approved by the Owner's Representative,
 - 1) When the final cured-in-place product meets the intent of ASTM F1216.
 - 2) Installation shall be in accordance with the manufacturer's recommendations and available for verification by the Owner's Representative.
5. Installer shall be capable of viewing the beginning of liner contacting host pipe;
 - a. Verify exact placement of liner.
6. No measuring from a CCTV counter or estimating will be allowed. Extract tube from carry device by controlled air or water pressure.
 - b. Hold tube in place against wall of host pipe by pressure until cure is complete
7. The CIPP point repair shall be an ambient cure system
 - a. Cure period shall be of a duration recommended by the resin manufacturer.
8. The finished pipe shall be continuous over the length of the internal point repair,
 - a. Overlap point repairs if necessary,
 - b. Be as free as commercially practicable from visual defects such as foreign inclusions, wrinkles, dry spots, pinholes, and delamination.
 - c. It shall also meet the leakage test requirements.

9. Alternate curing mediums may be used, including, but not limited to steam and ambient cure.
 - a. End product must meet or exceed the requirements of this section.
 - b. Alternate curing mediums and alternate installation methodologies must be submitted for approval to the Owner's Representative prior to the bid opening date as specified in the bid documents.
 - c. Notification of approval (or rejection) shall be made prior to bid opening.
 - d. When alternate curing mediums and/or alternate installation methodologies are approved for use,
 - 1) Follow all of the manufacturer's recommendations for installation and curing,
 - 2) No exceptions shall be permitted.
10. Should the Owner's Representative require a sample from the partial/segmental/point repair once sampling piece is cured and inflation bladder is deflated,
 - a. Remove bladder and launching device from host pipe.
 - b. Remove materials used in installation other than CIPP liner from host pipe.
 - c. Recover sample piece and label with upstream and downstream manhole numbers and footage from downstream manhole.
- J. Service Lateral Re-Instatement:
 1. Reconnect service connections using CCTV and a robotic cutter device to field locate laterals, reinstate, and determine number of service connections.
 - a. Service interruptions shall not exceed 8 hours.
 - b. Existing sewer service laterals will be internally reinstated to 100% of their pre-CIPP flow diameter.
 - c. The finished opening shall be smooth with no ragged edge, sand shall prevent clogging or blockages.
 2. Do not reconnect services from abandoned or vacant lots
 3. Unless otherwise directed by the Owner's Representative Show distance from nearest downstream manhole to reconnected service on record drawings
 4. Recover coupons at downstream manhole and remove.
 5. When a remote cutting device is used and a cleanout is available, then a mini-camera down the service may also be used to assist the operator in cutting or trimming.
 6. All service lateral reinstatements will be wire brushed to eliminate burrs and snags.

3.04 POST INSTALLATION

- A. CIPP installation shall be free from visual defects such as foreign inclusions, dry spots, keel, boat hull, pinholes, wrinkles, and other deformities.
 - 1. Defects and deformities may, at discretion of the Owner's Representative, be cause for rejection of entire liner.
 - a. Correct failed CIPP and defective CIPP from post installation television inspection or test reports for structural values or thickness as determined by the Owner's Representative.
 - b. Method of repair,
 - c. May require field or workshop demonstration,
 - d. Requires approval by the Owner's Representative prior to commencement of Work
 - 2. Remove and replace pipe identified with defects or deformities at the Contractor's expense.
- B. Both ends of the cured Liner shall be cut smoothly 2" from the inlet and outlet points in the manhole.
 - 1. Sealed with an epoxy or resin mixture compatible with the Liner/resin system,
 - 2. Providing a watertight seal.
 - 3. Sealing material and installation method shall be submitted and approved by the Owner's Representative prior to start of construction.
 - 4. Hydraulic cements and quick-set cement products are not acceptable.
- C. Where liners of any type are installed in two or more continuous manhole to manhole segments,
 - 1. Liner invert through the intermediate manholes shall be left intact.
 - 2. Final finishing of the installation in intermediate manholes shall require removal of the top of the exposed liner
 - 3. Neatly trimming of the liner edge where it touches the lip of the manhole bench.
- D. Portions of any piece of liner material removed during installation shall be available for inspection and retention by the Owner's Representative.
 - 1. All manhole drop connections shall be reviewed on an individual basis. Reinstate openings for all drop assemblies after relining mainline sewer.
 - 2. Outside drop assemblies shall be lined with a cured-in-place liner compatible with the mainline liner, for the full length of the drop assembly and bend.
 - 3. Drop assemblies inside manholes are not required to be relined, unless

directed by the Owner's Representative.

3.05 SAMPLE TESTING

- A. The Contractor shall have an independent testing laboratory analyze finished liner samples taken from manhole cutoffs, service coupons, etc.
1. A minimum of one (1) 12-inch long restrained sample shall be taken from each liner segment installed, or as directed by the Owner's Representative.
 2. Physical samples removed for testing shall be individually labeled and logged to record the following:
 - a. Owner's Project number and title
 - b. Sample number
 - c. Segment number of line as noted on plans
 - d. Date and time of sample
 - e. Name of Contractor
 - f. Location and by whom tested
 - g. Results of test
 - h. Street name and address
 3. Send one sample from each liner segment installed to test in accordance with applicable ASTM standards for:
 - a. Tensile Properties,
 - b. Flexural Modulus,
 - c. Flexural Strength,
 - d. Wall thickness shall be conducted, a minimum of three samples per project will be tested.
 - e. If tests do not meet the minimum values:
 - (1) Additional samples originally not sent for testing may be required to be tested, as directed by the Owner's Representative.
 - (2) Contractor bears all costs associated with additional testing.

Property	ASTM Test Method	Minimum Value
Flexural Strength	D790	4,500 psi
Flexural Modulus	D790	250,000 psi
Tensile Strength	D638	3000 psi
Thickness	D5813	Contract requirement

4. Resin Sampling:

- a. Wet-out facility resin mixing equipment shall have a valve downstream of the mixing function and immediately upstream of application of mixed resin of tube where resin samples may be drawn
 - b. Batch mix facilities, if any, shall provide sampling of mixed batch
 - c. Submitted “wet-out” schedule cannot be modified without 24-hour notice to Program Manager
 - d. Resin samples shall be drawn at times determined by Owner’s Representative.
 - e. Perform prior to conducting laboratory tests.
 - f. Take a wall thickness measurement in accordance with ASTM D2122
 - g. Make a minimum of four measurements, evenly spaced, on each test specimen
 - h. Average thickness shall be equal or greater than required design thickness.
 - i. Failure of thickness shall be grounds for rejection for CIPP liner.
5. Field thickness testing:
 - 1) Calculate average thickness using measured values.
 6. If properties test do not meet the minimum physical and thickness requirements, the CIPP shall be repaired or replaced at the Contractor’s expense.
 7. All curing, cutting, and identification of samples will be witnessed by the Owner’s Representative.

3.06 TELEVISION INSPECTION

- A. Perform television survey in accordance with the requirements of Section 01510 – Sanitary Sewer Main Television and Sonar Inspection (CCTV).
 1. CCTV shall be performed
 - a. Prior to installation of the CIPP but after pre-lining cleaning.
 - b. After installation of CIPP line and the reconnection of all active sewer laterals.
- B. Conduct finished inspections continuous over entire length of sewer between manholes within 48 hours of installation
 1. Liner shall be free from visual defects, damage, and deflection.
- C. No visible infiltration through the liner, at the joints, at the service connections or at the manholes

3.07 TESTING

- A. Base acceptance of liner on videotaped CCTV inspection and that defects described in 1, above, do not exist.
 - a. Corrections of defects or failures identified in post-installation CCTV shall be repaired at no cost to Owner
 - b. Method of repair shall be approved by Owner's Representative prior to completion of work.
- B. Full Length CIPP testing shall be in accordance with Section 02650 – Testing for Acceptance of Sanitary Sewers.
- C. Partial/Segmental/Point Repair CIPP testing shall be in accordance with Section 3.06 Television Inspection of this specification.

3.08 ACCEPTANCE

- A. Laboratory Testing: one sample shall be sent to an independent laboratory and tested.
 - 1. Preparation and testing standards shall be performed in accordance with the approved submittals.
 - 2. Failure of any test can be grounds for rejection of the CIPP liner.
 - 3. At the direction of the Owner's Representative a second sample shall be tested.
- B. Destructive Testing: Where test results of samples from the 12-inch long pipe section are lower than required values, at the direction of the Owner's Representative, Contractor shall cut samples from liner along length of pipe.
 - 1. The size and shape of the samples shall be determined by the Owner's Representative.
 - 2. The Contractor shall repair the CIPP liner and host pipe at no additional cost to the Owner.
 - 3. Failure of test shall be grounds for rejection for the CIPP liner.
- C. Resin Sampling: Owner's Representative drawing the samples will arrive unannounced and shall be afforded immediate access to the equipment.
 - 1. Resin sample shall be sent to the independent laboratory and tested.
 - 2. Testing standards shall be performed in accordance with approved submittals.
 - 3. Failure of any test can be grounds for rejection for the CIPP liner.

- D. Low-pressure air testing or hydrostatic exfiltration test: acceptance based on successful completion of this test as specified herein.
- E. The Contractor shall submit to the Owner's Representative, for acceptance and approval,
 - 1. Two (2) copies of unedited post-installation CD/DVDs Associated certified test reports for each sewer main segment within 10 working days of the Liner installation.
 - 2. No more than one sewer main segment shall be included on a post- installation inspection CD/DVD or curing report.
- F. It is the intent of these specifications the completed liner, with all appurtenances to be essentially equivalent in final quality and appearance to new sewer pipe installation.
 - 1. The conditions of the existing host pipe will be taken into consideration.
- G. Where, in the opinion of the Owner's Representative, a defect in the CIPP liner requires removing a section of the CIPP liner, the Contractor shall make all repairs as directed by the Owner's Representative and shall install a segmental liner, compatible with the CIPP liner, to accomplish a continuous finished liner.
 - 1. No separate measurement and payment will be made for such defect repair or for the post-repair segmental liner.

3.09 PRIVATE SERVICE LINE SHUTDOWN

- A. Notify Owner's Representative at least 1 week prior to shutdown
- B. When it is necessary to shut down a private sewer service line notify building occupants regarding service lateral disconnection by placing a door hanger approved by the Owner's Representative.
 - 1. Place door hangers 48 hours prior to shut down.
- C. When service lateral will be disconnected from main for more than 8 hours, lateral shall be positively drained or pumped down.
 - 1. Monitor status of flow and storage
 - 2. Pump lateral more frequently where flows exceed storage capacity of lateral or Contractor provided temporary storage
- D. If service lateral cannot be positively drained or pumped down or disconnection of service is anticipated being 8 hours or longer,
 - 1. Contractor shall provide temporary living accommodations for resident at no additional cost to Owner or resident.
 - 2. Temporary living accommodations shall be approved by Program Manager and coordinated through resident and Owner's Customer Support Representative
 - 3. Alternatively, Contractor may supply a temporary bypass pumping system to keep the

lateral operational.

- E. Notify building occupants when work is complete and uninterrupted service restored
- F. Commercial sewer services shall be maintained at all times while the business is open.
- G. No sewage from the services or main line shall be discharged on the ground or in waterways.
- H. Holding pits or tanks are not allowed unless permitted by Federal, State, and local authorities having jurisdiction.

3.10 CLEANUP

- A. After the CIPP liner installation work has been completed and all testing acceptable, the Contractor shall clean up the work area.
 - 1. All excess material and debris not incorporated into the permanent installation shall be disposed of by the Contractor.
 - a. The debris and liquids are to be disposed of properly in accordance with all applicable laws.
 - b. The local municipality can furnish a letter to the landfill stating the Contractor is authorized to dispose of the non-hazardous materials.
 - c. Debris and liquids type and quantities are to be tracked in the daily contractor diary.
 - d. Hauling and disposal costs will be borne by the Contractor.
 - 2. The work area shall be left in a condition equal to or better than prior condition.
 - a. Disturbed grassed areas shall be seeded or sod placed as directed by the Owner's Representative at no additional cost to the Owner.
 - b. The work site restoration work shall be completed in accordance with the requirements of Section 02276 – Site Restoration and Erosion Control.

3.11 DOCUMENTATION

- A. The Contractor shall complete work on each asset as assigned via the Owner's Computerized Work Order Management system.
 - 1. Upon start of work, the Contractor shall receive work orders as assigned by the Owner's Representative.
 - 2. The Contractor shall maintain and synchronize the status of each rehabilitation work order issued.

3.12 WARRANTY

- A. Material Warranty: A written guarantee of 2 years shall be provided by manufacturer against

breakdown of material effectiveness or structural repair elements

- B. Workmanship Warranty: The Contractor shall guarantee his work for a warranty period of two (2) years from the date of final acceptance against any leakage, cracking, loss of bond, or other discontinuity as identified.
1. Deficiencies related to material and workmanship shall be repaired by contractor to the satisfaction of the Program Manager and at no additional cost.
 2. If repairs are made, then the Contractor shall warrant the work for one (1) year in addition to the original warranty period required by the Contract.

END OF SECTION

SECTION 02513

ASPHALT CONCRETE PAVING

PART 1: GENERAL

1.01 DESCRIPTION

This section includes materials, testing, and installation of asphalt concrete pavement, aggregate base course, and tack coat.

1.02 RELATED WORK SPECIFIED ELSEWHERE

Section 02200: Earthwork

1.03 SUBMITTALS

Submit report from a testing laboratory verifying that aggregate material conforms to the specified gradations or characteristics.

PART 2: MATERIALS

2.01 ASPHALT CONCRETE PAVING

Asphalt concrete paving shall conform to Type A in Section 39 of the State Specifications, having 1/2-inch-maximum medium grading.

2.02 AGGREGATE BASE COURSE

Aggregate base shall be Class 2 aggregate base, 3/4-inch-maximum size per Section 26 of the State Specifications. Aggregate shall contain no detectable asbestos.

2.03 TACK COAT

Tack coat shall conform with SS1 paving asphalt per Section 94 in the State Specifications.

2.04 ASPHALT

Asphalt shall be PG 64-10. Asphalt content in the pavement shall be 5.5% to 6.0%.

2.05 AGGREGATE FOR ASPHALT CONCRETE

Aggregate shall be Type A per Section 39-1.02 E in the State Specifications. Aggregate shall contain no detectable asbestos.

2.06 SEAL COAT (NOT APPLICABLE)

Seal coat shall be Type II slurry seal per Section 37 of the State Specifications.

2.07 REDWOOD HEADER

Size of redwood headers shall be 2-inches by the depth of the asphalt concrete paving; minimum size shall be 2-inches by 6-inches. Redwood shall be Construction Heart Grade stamped by the California Lumber Inspection Service.

2.08 PAINT FOR TRAFFIC AND PARKING LOT STRIPING AND MARKING

Provide white thermoplastic paint per Section 84 of the State Specifications.

PART 3: EXECUTION

3.01 PAVEMENT REMOVAL

- A. Initially cut asphalt concrete pavement with pneumatic pavement cutter or other equipment at the limits of the excavation and remove the pavement. After backfilling the excavation, saw cut or grind asphalt concrete pavement to the full depth of pavement at a point not less than 9 inches outside the limits of the excavation or the previous pavement cut, whichever is greater, and remove the additional pavement.
- B. Saw cut or grind concrete pavement, including cross gutters, curbs and gutters, sidewalks, and driveways, to the full depth of pavement at a point 1 foot beyond the edge of the excavation and remove the pavement. The concrete pavement may initially be cut or grinded at the limits of the excavation by other methods prior to removal and the saw cut or grind made after backfilling the excavation. If the saw cut or grinder falls within 3 feet of a concrete joint or pavement edge, remove the concrete to the joint or edge.
- C. Make arrangements for and dispose of the removed pavement.
- D. Final pavement saw cuts or grinding shall be straight along both sides of trenches, parallel to the pipeline alignment, and provide clean, solid, vertical faces free from loose material. Saw cut or grind and remove damaged or disturbed adjoining pavement. Saw cuts or grinding shall be parallel to the pipeline alignment or the roadway centerline or perpendicular to same.

3.02 PAVEMENT REPLACEMENT

The pavement section replacement shall be as shown on the drawings.

3.03 ASPHALT COLD MILLING

Asphalt cold milling shall be performed where called for on plans. Cold milling shall be done using an automated pavement planer capable of maintaining an accurate depth.

- A. Cold asphalt milling shall be provided to create an even surface for asphalt overlay. The overall length of the milling machine (excluding the conveyor) shall be a minimum of 18 feet and having a minimum cutting width of six feet. The milling operation shall be operated to effectively minimize the amount of dust being emitted from the machine. Pre-wetting of the pavement may be required in areas where milling is to be performed around utility structures such as manholes, valve boxes etc., proper caution shall be taken as not to damage any of the structures. Saw-cutting of the concrete surrounding the structure and

using a pick or other means so as not to disturb the structure shall be employed to prevent any damage. Prior to opening an area which has been milled to traffic, the pavement shall be thoroughly swept with a power broom or other approved equipment to remove to the greatest extent practicable, the fine material which will dust under traffic. This operation shall be conducted in a manner so as to minimize air pollution.

B. The milling operation shall be continuous to avoid delays.

3.04 INSTALLATION

Producing, hauling, placing, compacting, and finishing of asphalt concrete shall conform to Section 39 of the State Specifications. Apply seal coat to all paving except open asphalt concrete.

3.05 CONNECTIONS WITH EXISTING PAVEMENT

Where new paving joins existing paving, saw cut or grind the existing surfaces 12 inches back from the joint line full depth. Dispose of waste material offsite. Tack prior to placing the asphalt concrete. Meet lines shall be straight and the edges vertical. Paint the edges of meet line cuts with liquid asphalt or emulsified asphalt prior to placing asphalt concrete. After placing the asphalt concrete, seal the meet line by painting with a liquid asphalt or emulsified asphalt and then immediately cover with clean, dry sand.

3.06 PREPARATION OF SUBGRADE

A. Scarify subgrade to a depth of 12-inches below finished subgrade elevation and compact to 95% minimum relative compaction. Shape subgrade to line, grade, and cross section shown in the drawings. The subgrade shall be considered to extend over the full width of the base course.

B. The finished subgrade shall be within a tolerance of 0.05 of a foot of the grade and cross section shown and shall be smooth and free from irregularities and at the specified relative compaction.

3.07 PLACING AGGREGATE BASE COURSE

Place aggregate base course to a minimum thickness as specified for the roadway. Compact to 95% relative compaction. Install in accordance with Section 26 of the State Specifications.

3.08 COMPACTION OF AGGREGATE BASE AND LEVELING COURSES

Compaction and rolling shall begin at the outer edges of the surfacing and continue toward the center. Apply water uniformly throughout the material to provide moisture for obtaining the specified compaction. Compact each layer to the specified relative compaction before placing the next layer.

3.09 PLACING TACK COAT

Apply tack coat on surfaces to receive finish pavement per Section 39-1.09C in the State Specifications. Apply tack coat to metal or concrete surfaces that will be in contact with the asphalt

concrete paving.

3.10 PLACING ASPHALT PAVING

Install in accordance with Section 39-2 in the State Specifications.

3.11 COMPACTION OF ASPHALT CONCRETE PAVING

Compact until roller marks are eliminated and a density of 92% minimum to 98% maximum has been attained per ASTM D 2041. Compacting equipment shall conform to the provisions of Section 39-2.04, "Compacting Equipment."

END OF SECTION

SECTION 02530

SERVICE LATERAL RECONNECTION AND REPLACEMENT

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Work this section includes the reconnection of existing service laterals to the sewer main and the replacement of sewer laterals.

1.02 RELATED SECTIONS

- A. Section 01510: Sanitary Sewer Main and Lateral Television Sonar Inspection
- B. Section 01520: Sewer Flow Control
- C. Section 02223: Trenching, Backfilling, and Compacting
- D. Section 02225: Structure Excavation and Backfill
- E. Section 15062: Ductile Iron Pipe
- F. Section 15071: Plastic Pipe

1.03 SECTION 02600 – WASTEWATER FLOW CONTROL REFERENCES

- A. ASTM A746 - 09 Standard Specification for Ductile Iron Gravity Sewer Pipe.
- B. ASTM D1784 - 11 Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
- C. ASTM D3034 - 08 Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
- D. ASTM D3212 - 07(2013) Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.

1.04 SUBMITTALS

- A. The Contractor shall complete a daily written record (diary) detailing the work carried out and any small items of Work which were incidental to the Work. The Contractor shall include in his daily record and reference to the following:
 - 1. Delays: Dense traffic, lack of information, sickness, labor or equipment shortage, etc.
 - 2. Weather: Conditions (e.g., rain, sunny, windy, etc.).

3. Equipment: On site (e.g., specialty cleaning, by-pass equipment, etc.).
4. Submittals: To the Owner's Engineer.
5. Personnel: On site by name (e.g., all labor, specialty services, etc.).
6. Accident: Report (e.g., all injuries, vehicles, etc.).
7. Incident: Report (e.g., damage to property, property owner complaint, etc.).
8. Major defects encountered: including collapsed pipe, if any, cave-ins, sinkholes, etc.
9. Visitors: On site.
10. Disposals: Type and quantity of debris (including liquids).

1.05 EXPERIENCE

- A. See requirements stated in procurement documents.
- B. Prior to beginning work, Contractor shall submit certification or documentation of the following:
 1. The supervisor of the field crews shall have received proper training and have a minimum of three (3) years' experience in performing the type of work covered under this section of these Specifications including safe working practices, confined space entry procedures, the types of equipment being used, product/materials being used, etc.
 2. Field crew leaders shall have received proper training in this function and have a minimum of two (2) years' experience in performing the type of work covered under this section of these Specifications including safe working practices, confined space entry procedures, the types of equipment being used, product/materials being used, etc.
 3. OSHA Confined Space and Trench, Excavation Safety training for all crewmembers.
 4. The Contractor shall provide the Owner's Engineer with written documentation that the supervisor, crew leader/s, and all crewmembers have received the proper training and where required the requisite experience.

1.06 SAFETY

- A. All work shall be performed in accordance with OSHA standards and state and federal safety regulations.
- B. No person shall enter a confined space without the documented requisite training, certification, and entry permit.

PART 2 - PRODUCTS

2.01 PIPE AND FITTINGS

- A. All materials shall be pre-approved by the Owner.
- B. The Contractor shall use PVC (minimum SDR 26) pipe, or Pressure Class 150 ductile iron pipe for 6-inch service lateral connections. All laterals segments within the roadway shall be replaced with ductile iron pipe. Transition from DIP to PVC with approved fittings beyond the edge of pavement is allowed.
- C. PVC pipe shall be gasket jointed conforming to the requirements of ASTM D-3212.
- D. For reconnection of existing services, the Contractor shall select service connection pipe diameter to match existing service diameter.
- E. The Contractor shall connect service laterals to the sewer mains with prefabricated sewer wye conforming to the specifications for the sewer main pipe material as specified in other sections of these Specifications, or other as approved by Owner's Engineer. The use of tees is prohibited without permission from the Owner's Engineer.

2.02 PIPE SADDLES

- A. The Contractor shall use pipe saddles only on rehabilitated sanitary sewer mains.
- B. The Contractor shall supply Romac Industries, Inc. Style "CB" sewer saddle, branch type universal or Owner approved equal. The Contractor shall use a saddle fabricated to fit the outside diameter of the pipe to which it will be attached.

2.03 COUPLINGS AND ADAPTER

- A. For connection between new PVC pipe or DIP service lateral and an existing service, the Contractor shall use a PVC C-900 rubber-gasket transition adapter when going from Ductile Iron or C-900 to Schedule 40 pipe. Couplings should be shear style couplings with a stainless-steel band to prevent offsets.

2.04 CLEANOUTS

- A. PVC, SDR 26 pipe and fitting shall be utilized for the installation of six- (6) inch cleanouts.
- B. Rubber couplings as manufactured by Fernco, Inc. or Owner approved equal shall be utilized for pipe connection to the existing pipe.
- C. Rubber doughnut gasket adapters shall be manufactured by Fernco, Inc. or Owner approved equal.

PART 3 - EXECUTION

3.01 PROTECTION

- A. The Contractor shall not allow sand, debris, or runoff to enter the sewer system. The Contractor shall ensure that wastewater does not backup into private property. The

Contractor shall establish a plan to prevent sewer backups when reconnections are not accomplished in a timely manner.

- B. The Contractor shall provide for diversion of wastewater if necessary, in accordance with the requirements of Section 01520 – Sewer Flow Control. The Owner may direct the Contractor to use cleanouts to bypass wastewater from adjacent facilities if the possibility of wastewater backup is likely.
- C. The Contractor shall be responsible for any and all damage to property due to his work.

3.02 PREPARATION

- A. The Contractor shall provide a minimum of forty-eight- (48) hour written notice to property owners whose sanitary sewer service will potentially be interrupted.
- B. The Contractor shall properly disconnect existing connections from the sewer and reconnect to the main line, as described in this section.
- C. The Contractor shall reconnect service connections, including those that go to unoccupied or abandoned buildings, unless directed otherwise by the Owner's Engineer.
- D. The Contractor shall complete reconnection of all service lines within twenty-four- (24) hours.

3.03 RECONNECTION ON REPLACEMENT SEGMENTS

- A. The Contractor shall install a new service wye on the new sanitary sewer main for each service connection. The service wye shall be of a material compatible with the sewer main material.
- B. The Contractor shall remove and replace cracked, offset, or leaking service line from the center of the new sewer main up to the first fitting or five (5) feet, whichever occurs first.
- C. The Contractor shall make up the connection between new sewer main and existing service lateral using PVC C-900 or ductile iron sewer pipe and approved fittings and couplings.

3.04 UTILITY SERVICE REPAIRS

- A. Where service connections or lines from water or gas mains or sewers to the user's premises are disconnected, broken, damaged, or otherwise rendered inoperative by the Contractor for any reason, the Contractor shall, at his own expense, arrange with the respective utility company for any repairs of lines under their jurisdiction. For lines not within their jurisdiction, the Contractor shall repair or replace same and restore service to the premises.

3.05 SPECIAL CONSIDERATIONS

- A. The Contractor shall notify the Owner's Engineer of any service stub that is collapsed, has severe root intrusions, or is otherwise in poor condition. The Owner's Engineer will make a determination on a case-by-case basis whether to proceed with the cleanout installation or replace the entire service stub. All replacement service stubs will be six- (6) inch and shall

be installed in accordance with City Standards

- B. The Contractor shall notify the Owner of conflicts with other utilities, which prevent the installation of a cleanout as specified herein and make recommendations to resolve such conflicts.
- C. Every effort shall be made to complete the installation and backfill excavations each day. In situations where the installation cannot be completed, the site may only be left open overnight with proper safety barriers and warning signs alerting the public to the hazard. The Contractor shall be responsible for providing and installing all barriers, barricades, fence, warning tape, and other items necessary to safely secure the work site.
- D. Without written permission from the property owner, the spoil pile may only be placed within the easement area, right-of-way or Owner roadway and is not to be placed on private property. Where pedestrian or vehicular traffic is obstructed, the Contractor shall provide adequate safety measures to protect against accident or injury.
- E. Vehicles and construction equipment shall not be parked and left on private property.
- F. The Contractor shall repair damages to sprinkler systems including those that are installed within the Owner right-of-way and/or sanitary sewer easement. It is recommended that the Contractor confer with each property owner concerning the possibility of sprinklers and the locations thereof during the notification process.

3.06 TESTING

- A. The completed cleanout installation shall be televised, both externally and internally with a color CCTV camera. The same camera shall capture and record a picture of the house or street address of the installation. Without pause in recording, the Contractor shall pan over the restoration of property, the cleanout box, and insert the camera into the cleanout installation. The Contractor shall pass the camera through the cleanout, into the wye and through that portion of the six- (6) inch pipe installed. Any defects found during inspection shall be noted and corrected at no additional expense to the Owner. The Contractor shall make appropriate repairs until the cleanout installation passes the video inspection.
- B. When directed by the Owner's Engineer, the Contractor shall perform smoke testing, dye testing, or low pressure hydraulic testing to confirm reconnection.
- C. All inspections shall be submitted following the standards and formats as outlined in Section 01510 – Sanitary Sewer Main and Lateral Television and Inspections (CCTV).

3.07 CLEANUP

- A. After installation work has been completed and all testing acceptable, the Contractor shall clean up the work area. All excess material and debris not incorporated into the permanent installation shall be disposed of by the Contractor. The debris and liquids are to be disposed of properly in accordance with all applicable laws. The local municipality can furnish a letter to the landfill stating that the contractor is authorized to dispose of the non-hazardous materials. Debris and liquids type and quantities are to be tracked in the daily contractor diary. Hauling and disposal costs will be borne by the contractor. The work area

shall be left in a condition equal to or better than prior condition. Disturbed grassed areas shall be seeded or sod placed as directed by the Owner's Engineer at no additional cost to the Owner. The work site restoration work shall be completed in accordance with the Section 02276 – Site Restoration and Landscaping.

3.08 WARRANTY

- A. The Contractor shall guarantee his work for a warranty period of one (1) years from the date of final acceptance.
- B. Within the warranty period, the Owner may inspect the work, and if repairs are needed, the repairs shall be made on a case-by-case basis at no cost to the Owner. For the localized repairs, the warranty period shall be one additional year.
- C. If the frequency of similar defects requiring repair increases, then the entire project will be re-evaluated.

END OF SECTION

SECTION 02601

MANHOLES AND CLEANOUTS

PART 1: GENERAL

1.01 DESCRIPTION

The work of this section consists of the furnishing of materials and constructing there with new manholes and cleanouts as shown on the drawings.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01300: Submittals
- B. Section 01666: Testing of Gravity Sewer Lines and Manholes
- C. Section 02223: Trenching Backfilling and Compacting
- D. Section 02225: Structure Excavation and Backfill
- E. Section 03100: Concrete

1.03 QUALITY ASSURANCE

Standards, American Association of State Highway and Transportation Officials (AASHTO) and American Society for Testing and Materials (ASTM).

1.04 SUBMITTALS

Shop Drawings and catalog cut sheets shall be submitted for manhole, frames and covers, precast manhole bases and sections, joint sealer, cleanout meter box, pressure clean-out covers, and epoxy lining in accordance with Section 01300.

PART 2: MATERIALS

2.01 FRAMES AND COVERS

- A. All castings for manhole frames and covers shall be of tough, uniform quality, gray iron, free from cracks, holes, swells, cold shuts or other defects and be of workmanlike finish. Castings for frames and covers shall conform to the requirements of the "Specifications for Gray Iron Castings," Class 25 (ASTM A48).
- B. Horizontal surfaces of manhole cover seats and under surface of the seat cover which rests upon the frame shall be machined. After machining, it shall not be possible to rock any cover after it has been seated in any position in its frame. Manhole frames and covers shall be designed for heavy duty, H-20 traffic loading. All manholes shall be provided with a nominal 24-inch diameter cover unless otherwise noted on the drawings. Manhole frames shall be capable of receiving standard non-shifting manhole extension (riser) rings.

- C. Manhole frames and covers shall match the City Standard and be manufactured by D & L Supply A1021, or equal. The wording on the covers shall include the word “sewer” in the lid.

2.02 PRECAST CONCRETE MANHOLE SECTIONS

Manholes shall be constructed of precast reinforced manhole sections conforming to ASTM C478 and as shown. Precast concrete rings, cones, and flat slabs shall be manufactured by a process that will produce a dense, homogeneous concrete section of first quality. Cement used in all precast sections shall conform to State Specifications “Type II Modified”.

2.03 PRECAST MANHOLE BASES

Precast manhole bases as manufactured by Jensen Precast, Forterra Concrete Products, Oldcastle Precast or equal, may be used, subject to approval.

2.04 PRECAST CONCRETE MANHOLE FLAT LID

- A. Designed to meet H-20 loading requirements.
- B. Tested in accordance with ASTM C497.

2.05 CONES

All manhole cones shall be eccentric unless otherwise shown on the plans and conform to ASTM designation C478.

2.06 JOINT SEALER

The joint sealer shall be Ram-Nek by K.T. Snyder Company, Inc.; Kent-Seal by Hamilton-Kent, or equal.

2.07 CLEANOUTS

Cleanout covers shall be concrete meter box with cover, Brooks No. 36; Christy B9 Utility Box, with B9D lid, or equal.

2.08 MORTAR

One part Portland cement, 1 part hydrated lime, and 6 parts sand.

2.09 NON-SHRINK GROUT

Shall be non-shrink epoxy type suitable for pressure grouting, Embeco; Master Builders Co., or equal.

2.10 INTERIOR AND EXTERIOR COATINGS (NOT APPLICABLE FOR THIS PROJECT)

- A. Exterior: Buried exterior concrete shall be coated with an emulsified asphalt coating, Specification Section 07175.

- B. Interior: Refer to Specifications Section 09900.

PART 3: EXECUTION

3.01 SETTING BASES

- A. Construct to grades, lines and elevations shown on the drawings or staked in the field. Shape tops of the bases by means of accurate bell-ring forms to receive the barrel section. Wet setting is not permitted. Joint sealer shall be placed on the first joint after the Engineer has approved the manhole base for stacking. The concrete shall cure a minimum of 24 hours before stacking the barrel sections.

Pour foundations on 12-inches of compacted crushed rock wrapped in filter fabric. See section 02200 and standard manhole details.

- B. Precast bases shall be placed on 12-inches of compacted crushed rock wrapped in filter fabric. See section 02200 and standard manhole details.
- C. Pipe Stubs shall be built into the structures as shown on the plans. The outer ends shall be sealed securely by a removable stopper of the same material as the branch.

3.02 SETTING PRECAST SECTIONS

Precast-reinforced concrete sections shall be set so as to be vertical and with sections in true alignment. Joints shall be primed and made with sealer applied in strict accordance with the manufacturers printed instructions.

3.03 FIELD CONNECTIONS

Openings for field connections shall be made with a motor driven cutting tool which will provide a smooth round opening no more than 3 inches larger than the outside diameter of the pipe being connected. Jack hammers and chipping hammers will not be allowed. Seal field connections with non-shrink grout.

3.04 INTERIOR DROPS

Install interior drops as detailed on the plans.

3.05 INVERT CHANNELS

Smooth and semi-circular in shape conforming to the inside of the adjacent sections. Make changes in flow direction by a smooth curve of radius as large as permitted by manhole size. Make changes in size and grade gradually and evenly. See plans for details.

3.06 SETTING FRAMES AND COVERS

Frames and covers shall be set as detailed on the plans for various locations.

3.07 CLEANOUTS

Installation of cleanouts shall be as detailed on the drawings.

3.08 MANHOLE TESTING

- A. Perform testing in the Engineer's presence prior to backfilling and interior coating. Notify Engineer at least 48 hours prior to testing.
- B. Sewer manholes shall be tested in accordance with the requirements of Section 01666.

END OF SECTION

SECTION 02621

FILTER FABRIC

PART 1: GENERAL

1.01 DESCRIPTION

This section includes materials and installation of nonwoven geotextile fabric riprap over properly prepared subgrade the protection of channels, structures, and embankments.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02200: Earthwork
- B. Section 02223: Trenching, Backfilling, and Compacting
- C. Section 02225: Structure Excavation and Backfill

1.03 REFERENCES

- A. ASTM International (ASTM):
 - 1. D 4491 - Standard Test Method for Water Permeability of Geotextiles by Permittivity.
 - 2. D 4632 - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
 - 3. D 5261 - Standard Test Method for Measuring Mass per Unit Area of Geotextiles.

1.04 DEFINITIONS

- A. Filter fabric: Nonwoven geotextile fabric manufactured from polypropylene fibers.

1.05 SUBMITTALS

- A. Product data.
- B. Samples.
- C. Quality control submittals:
 - 1. Certificates of Compliance.
 - 2. Manufacturer's Instructions.

1.06 DELIVERY, STORAGE, AND HANDLING**A. Storage and protection:**

1. Furnish filter fabric in protective covers capable of protecting the fabric from ultraviolet rays, abrasion, and water.

1.07 PROJECT CONDITIONS

- A. Take field measurements to determine the lengths and dimensions of the surfaces to receive the fabric.

PART 2: PRODUCTS**2.01 MANUFACTURERS****A. One of the following or equal:**

1. Amoco, Style 4550.
2. TenCate Nicolon, Charlotte, NC, Mirafi 140N.

2.02 MATERIAL REQUIREMENTS

- A. Physical properties: Meet the following minimum requirements:

PROPERTY	TEST METHOD	REQUIREMENT ⁽¹⁾
Minimum Weight	ASTM D 5261	4.5 ounces per square yard
Grab tensile strength	ASTM D 4632	100 pounds
Grab tensile elongation	ASTM D 4632	50 percent.
Minimum Permittivity	ASTM D 4491	1.7 per second

(1). Minimum average roll values.

PART 3: EXECUTION**3.01 EXAMINATION**

- A. Verification of conditions: Verify that conditions are satisfactory for the installation of filter fabric.

3.02 PREPARATION

- A. Surface preparation:
 - 1. During grading operations, take care not to disturb the subgrade.
 - 2. This may require use of lightweight dozers for low strength soils such as saturated, cohesionless, or low cohesion soils.
- B. Prior to placement of fabric: Prepare surface to smooth condition free of debris, depressions, or obstructions that may damage the fabric.

3.03 INSTALLATION

- A. Follow manufacturer's installation instructions and as complimented herein.
- B. Place the filter fabric smoothly without folds or wrinkles.
- C. Use special care when placing the filter in contact with the soil so that no void spaces occur between the filter and the prepared surface.
- D. Overlap the parallel rolls and ends of rolls a minimum of 24 inches and not less than manufacturer's instructions.
- E. Do not drag filter fabric across subgrade.

3.04 FIELD QUALITY CONTROL

- A. Inspection:
 - 1. Before covering, the condition of the fabric will be observed by the Engineer to determine that no holes or rips exist in the fabric.
 - 2. Repair all holes and rips by placing a new layer of fabric extending beyond the defect in all directions a distance equal to the minimum overlap required for adjacent rolls.

END OF SECTION

SECTION 02900**SANITARY SEWER MANHOLE
REHABILITATION****PART 1 — GENERAL****1.01 SECTION INCLUDES**

- A. This section of these Specifications provides for rehabilitating manholes to include the repair/replacement/rebuilding/sealing of the base, trough, bench, walls, and cone, and removal of unsound construction material. Work includes surface preparation, sealing, and testing.

1.02 RELATED SECTIONS

- A. Section 01520: Sewer Flow Control
- B. Section 02276: Site Restoration and Erosion Control

1.03 REFERENCES

- A. The following published standards from the American Society for Testing and Materials International (ASTM)

ASTM C78	Flexural Strength of Concrete (Using Simple Beam With Third-Point Loading)
ASTM C109	Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimen)
ASTM C157	Length Change of Hardened Hydraulic-Cement Mortar and Concrete
ASTM C-191-08	Standard Test Methods for Time of Setting of Hydraulic Cement by Vicat Needle
ASTM C882	Standard Test Method for Bond Strength of Epoxy-Resin Systems Used With Concrete by Slant Shear
ASTM C876	Half-Cell Potentials of Uncoated Reinforcing Steel in Concrete
ASTM D543	Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents
ASTM D638-10	Standard Test Method for Tensile Properties of Plastics

ASTM D695-10	Standard Test Method for Compressive Properties of Rigid Plastics
ASTM D-790	Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
ASTM D2240-05 (2010)	Standard Test Method for Rubber Property—Durometer Hardness BS 7816-3:1998- (ASTM D2240-75 not found; this standard published 07/15/1998 by British Standards Institution.)
ASTM D2566	Withdrawn Standard: ASTM D2566 Test Method for Linear Shrinkage of Cured Thermosetting Casting Resins During Cure (Withdrawn 1993)
ASTM D2584	Standard Test Method for Ignition Loss of Cured Reinforced Resins
ASTM D4414	Standard Practice for Measurement of Wet Film Thickness by Notch Gages
ASTM D4541	Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
ASTM D4787	Standard Practice for Continuity Verification of Liquid or Sheet Linings Applied to Concrete Substrates

- A. International Concrete Repair Institute (ICRI) Technical Guideline No. 03730 - Surface Preparation Guidelines for the Repair of Deteriorated Concrete Resulting From Reinforcing Steel Corrosion.

1.04 SUBMITTALS

- A. All Submittals shall be received and approved by the Owner's Representative prior to beginning work.
- B. The Contractor shall submit the following items at least thirty (30) calendar days prior to starting manhole/vault rehabilitation:
1. Manufacturers' Certificate of Compliance certifying compliance with the applicable specifications and standards. The certifications shall list all materials furnished under this Section and confirm the materials furnished for rehabilitation system selected are compatible with one another.
 2. Certified copies of factory test reports required by the applicable standards, the manufacturer, and this Section.
 3. Manufacturer's handling, storage, and installation instructions and procedures.
 4. Manufacturer's Certification indicating the installer is approved to install specified rehabilitation system.

5. Documentation of successful projects in the specified rehabilitation system and confirmation of required experience.
 6. Shop drawings and samples for any material proposed as equal to a specified material. The Contractor shall submit sufficient manufacturer's information to include, but not be limited to, the rehabilitation system, equipment components, material/chemical properties, mixing and proportioning requirements, maximum pot life, film/coating thickness, curing, and environmental requirements for application
- C. The Contractor shall complete, and provide to the Owner's Representative, a daily written record (diary) detailing the work carried out and any small items of Work incidental to the Work. The Contractor shall include in his daily record and reference to the following:
1. Delays: Dense traffic, lack of information, sickness, labor or equipment shortage, etc.
 2. Weather: Conditions (e.g., rain, sunny, windy, etc.).
 3. Equipment: On site (e.g., specialty cleaning, by-pass equipment, etc.).
 4. Submittals: To the Owner's Representative.
 5. Personnel: On site by name (e.g., all labor, specialty services, etc.).
 6. Accident: Report (e.g., all injuries, vehicles, etc.).
 7. Incident: Report (e.g., damage to property, property owner complaint, etc.).
 8. Major defects encountered: including collapsed pipe, if any, cave-ins, sink holes, etc.
 9. Visitors: On site.
 10. Disposals: Type and quantity of debris (including liquids).

1.05 EXPERIENCE/QUALIFICATIONS

- A. The supervisor of the field crews shall have received proper training and have a minimum of three (3) years' experience in applying the specified product(s) covered under this section of the Specifications, practicing safe working practices and confined space entry procedures, and using the types of equipment and product/materials required. Submit confirming documentation.
- B. Field crew leaders shall have received proper training in this function and have a minimum of two (2) years' experience in applying the specified product(s) covered under this section of the Specifications, practicing safe working practices and confined space entry procedures, and using the types of equipment and product/materials required. Submit confirming documentation.
- C. Experience shall include, at a minimum, projects successfully completed, incorporating not less than 250 manholes and performed within the last 10 years using the specified rehabilitation system. Submit confirming documentation.
- D. No crewmembers shall enter confined spaces without the necessary certified training as

required under applicable Federal, State, and local laws, regulations, standards, policies, procedures, and requirements, and permit.

1.06 LINING SYSTEMS

The lining system used shall result in a monolithic structure to the shape and contour of the interior of the existing manhole. The lining system shall be completely water tight and free of any joints or openings other than pipe inlets, pipe outlets and the rim opening. The junction of the lining material with the pipe material at the inlets and outlets shall be watertight.

1.07 SAFETY

- A. All work shall be performed in accordance with OSHA standards and local, State and Federal safety regulations.
- B. No person shall enter a confined space without the documented requisite training, certification, and entry permit.

PART 2 — PRODUCTS

2.01 GENERAL

- A. Materials:
 - 1. The materials used shall be designed, manufactured, and intended for sewer manhole/vault rehabilitation and the specific application for which they are used. The materials shall have a proven history of performance in sewer manhole/vault rehabilitation for a minimum of 10 years nationally, regarding similar age, groundwater levels, and environmental characteristics. The materials shall be delivered to the Work Site in original unopened packages and clearly labeled with the manufacturer's identification and printed instructions. All materials shall be stored and handled per the manufacturer's published recommendations. All materials shall be mixed and applied per the manufacturer's written instructions.
 - 2. The Contractor shall warrant and save harmless the Owner against all claims for patent infringement and any loss thereof.
 - 3. Dispose of all wastes in accordance with applicable regulations.
 - 4. Each coating/lining system shall be designed for application over wet surfaces, but not active running water, without degradation of the final product and/or the bond between the product and the manhole/vault surfaces.
- B. Pressure grout active leaks:
 - 1. Pressure grout shall be an acrylamide gel pressure sealant system provided

by a single manufacturer. The acrylamide gel pressure sealant system shall consist of a dry powder chemical readily dissolvable in water to form a low viscosity solution stiffening to a gel when mixed with an aqueous persulphate catalyst and a triethanolamine activator.

2. During injection, chemical sealant shall be able to react in presence of infiltrating water.
3. The system shall have the following characteristics:
 - a. A minimum of ten (10) percent acrylamide base material by weight in the total sealant mix.
 - b. A higher concentration (percent) of acrylamide base material may be used to increase strength or offset dilution during injection.
 - c. Capable of withstanding submergence in water without degradation.
 - d. Prevent passage of water through manhole defect
 - e. Flexible as opposed to brittle or rigid.
 - f. In place, able to withstand freeze/thaw and wet/dry cycles without adversely affecting seal.
 - g. Mixing of component materials shall be compatible with field conditions
 - h. Residual sealing materials shall be easily removable from manhole bench.
 - i. Constant viscosity during reaction period.
 - j. Additives to increase viscosity, adjust cure time though the range of ten (10) seconds to one (1) hour, density, shrinkage, compressive strength, tensile strength, and pH.
 - 1) Diatomaceous earth (Celite 209 or equal) can be added to concentration of five percent.
 - 2) Use of other additives following manufacturer's recommendation and Engineer's approval.
 - k. Cured product shall be resistant to dehydration, homogeneous, chemically stable, non-biodegradable, firm, flexible gel. Any suggested manufacturer and material identification.
 - l. Root control additive 2, 6-Dichlorobenzonitrile, may be added following manufacturer's recommendation and the Owner's Representative's direction. Any suggested manufacturer and material identification.

C. Stopping active leaks (hydraulic cement):

1. A premixed fast-setting product, specifically formulated for leak control, creating a volume-stable waterproof cement plug consisting of hydraulic cement, graded silica aggregates, special plasticizing and accelerating agents. It shall not contain chlorides, gypsum's, plasters, iron particles, aluminum powder or gas-forming agents, or promote the corrosion of steel it may come in contact with. Set time shall be approximately one (1) minute. Ten (10) minute compressive strength shall be approximately 500 psi.
 - a. The product shall be designed to rapidly stop flowing leaks in vertical and horizontal, concrete and masonry surfaces.

Cure Time	Compressive Strength ASTM C109	Tensile Strength ASTM C496
1 day	3500 psi	-----
7 day	4900 psi	290 psi
28 day	5500 psi	575 psi

- b. Hydraulic cement shall be manufactured by Quadex, Madewell Products Corporation, Fosroc, IPA Systems, or approved equal.
 2. A silicate-based liquid accelerator field mixed with neat Portland cement. The set time shall be approximately one (1) minute.
 3. The elastomeric polyurethane resin-soaked method, using dry twisted jute oakum, or resin-rod with polyurethane resin (water activated).
- D. Patching, repointing, filling, and repairing non-leaking holes, cracks, and spalls in concrete and masonry manholes (Cement Mortar):
1. A premixed non-shrink cement-based patching material consisting of hydraulic cement, graded silica aggregates, special plasticizing and accelerating agents, which has been formulated for vertical or overhead use. It shall not contain chlorides, gypsums, plasters, iron particles, aluminum powder, or gas-forming agents or promote the corrosion of steel it may come into contact with. Set time (ASTM C-191) shall be less than thirty (30) minutes. One- (1) hour compressive strength (ASTM C-109) shall be a minimum of 200 psi and the ultimate compressive strengths (ASTM C-882- Modified) shall be a minimum of 1700 psi.
 2. The product shall display the following properties:

	Strength (psi)		
	Day	7 Day	28 Day
Compressive Strength (ASTM C 109)	3,875	4,550	6,190
Flexural Strength (ASTM C 78)	-----	825	985
Tensile Strength (ASTM C 496)	-----	290	575
Shrinkage (ASTM C 157, Modified)	0.04 Percent @ 28 Days		

3. Shall be a factory blended, low shrinkage, high strength, polymer modified, sprayable, microsilica mortar.
 4. The cement mortar shall be QM-1s Restore by Quadex, Inc., Mainstay ML-72 by Madewell Products Corporation, or approved alternate.
- E. Spray applied or centrifugally cast lightweight structural reinforced cement manhole lining (Cement Mortar):
1. A premixed non-shrink cement-based patching material consisting of hydraulic cement, graded silica aggregates, special plasticizing and accelerating agents, formulated for vertical or overhead use. It shall not contain chlorides, gypsums, plasters, iron particles, aluminum powder, or gas-forming agents or promote the corrosion of steel it may come into contact with. Set time (ASTM C-191) shall be less than 30 minutes. One-hour compressive strength as required in ASTM C-109. The product shall display the following properties:

	Strength (psi)		
	Day	7 Day	28 Day
Compressive Strength (ASTM C 109)	3,875	4,550	6,190
Flexural Strength (ASTM C 78)	-----	825	985
Tensile Strength (ASTM C 496)	-----	290	575
Shrinkage (ASTM C 157, Modified)	0.04 Percent @ 28 Days		

2. Shall be a factory blended, low shrinkage, high strength, polymer dcmodified, sprayable, microsilica mortar.
 3. Shall be suitable for low-pressure spray or trowel application for the repair of vertical and horizontal concrete and masonry structures.
 4. Cement mortar shall be QM-1s Restore by Quadex, Inc., MS-2A by Strong, Silatec MSM by CemTec (A.W. Cook Cements), SewperCoat or approved alternate.
- F. Spray applied corrosion protection (epoxy coating):
1. Only structures exhibiting damage due to corrosion shall receive the epoxy coating.
 2. The material sprayed onto the surface of the manhole shall be one-hundred percent (100%) solids high build epoxy coating formulated for application within a sanitary sewer environment.
 3. The coating thickness shall be a minimum of 125 mils in one (1) or two (2) multi-pass coats.
 4. The coating color shall typically be white or off white.
 5. If an adhesion coating is required between the concrete structure and the epoxy coating, the cost of the adhesion coat is included in the cost of the 100% solids, high build epoxy coating.

6. Manufacturer's published directions regarding surface preparation shall be followed and is included in the cost of the 100% solids, high build epoxy coating. Manufacturer shall approve preparation of surface prior to application.
7. The cured epoxy resin system shall conform to the following minimum structural standards:

	Strength (psi)
Compressive Strength (ASTM D-695)	13,000
Flexural Strength (ASTM D-790)	13,000
Tensile Strength (ASTM D-638)	7,000
Flexural Modulus (ASTM-790)	500,000

8. The epoxy coating shall be Mainstay DS-5 by Madewell Products Corporation, Raven 405 by Raven Lining Systems, Cor-Cote SC (Sewer Coat) by Sherwin-Williams or approved alternate.
9. Composite structure/corrosion protection system.
10. Only structures exhibiting damage due to corrosion shall receive the composite system.
11. The coating thickness shall be a minimum of 1/2-inch.
12. If an adhesion coating is required between the concrete structure and the composite system, the cost of the adhesion coat shall be included in the cost of the composite system.
13. The composite system shall be SewperCoat by Lafarge Aluminates or approved alternate.

PART 3 — EXECUTION

3.01 REHABILITATION OF MANHOLE STRUCTURE

- A. Contractor to provide the following items, but not limited to, as directed by the Owner's Representative:
 1. Pressure grout leaks.
 2. Repair leaking crack, joint and/or lift hole with hydraulic cement mortar.
 3. Repair non-leaking crack, joint and/or lift hole with non-shrink cement based mortar.
 4. Restore the structural integrity by lining the manhole with cement mortar.
 5. Provide corrosion barrier by lining the manhole with an epoxy coating.
 6. Restore the structural integrity of the manhole while providing corrosion barrier by installing a fiberglass insert liner.

7. Rebuild bench and trough using TYPE S cement mortar.
8. Provide thickness gauges, wet film gauges and other testing equipment to test the thicknesses, surface profiles and coating continuity as required by this specification.
9. Perform and pass vacuum test of a manhole.
10. Provide survey grade (+/- 0.01-foot) data on a manhole using GPS.
11. Provide survey grade (+/- 0.01-foot) data on a manhole using conventional survey methods.
12. Provide bypass pumping to facilitate rehabilitation activities.
13. Provide manhole condition assessment services.
14. Locate and expose buried manholes, adjust frame and cover heights as required
15. Install internal frame seal and external seal wraps
16. Remove intruding pipe or obstruction
17. Remove manhole steps

B. General Procedures:

1. **Cleaning:** All concrete and masonry surfaces to be rehabilitated shall be clean. All grease, oil, laitance, coatings, loose bricks, mortar, unsound brick or concrete and other foreign materials shall be completely removed. Initial cleaning shall be done by utilizing a minimum 5000 psi pressure washer with the proper nozzles; however, additional required cleaning shall be accomplished by other methods including but not limited to wet or dry sandblasting, acid wash, concrete cleaners, degreasers or mechanical means, as may be required to properly provide additional cleaning of the surface. All surfaces using these methods shall be thoroughly rinsed, scrubbed, neutralized and tested with test strips, in order to confirm the removal of all cleaning agents and their reactant products. Debris resulting from cleaning shall be removed from the manhole and not discharged downstream. The debris is to be disposed of properly in accordance with all laws. The local municipality can furnish a letter to the landfill stating the Contractor is authorized to dispose of the non-hazardous materials. Debris and liquids quantities are to be tracked in the daily Contractor diary.
2. **Stopping Infiltration:** After surface preparation and prior to the application of mortars and coatings, infiltration shall be stopped either by plugging with a hydraulic cement or chemical grout sealing.
3. **Patching:** All large holes and/or voids, joints or pipes, all spalled areas, all lifting holes and all holes caused by missing or cracked brick shall be patched and all missing mortar repointed using a non-shrink cement mortar. All cracked or disintegrated material shall be removed from the area to be patched or repointed, exposing a sound sub-base. All cracks not subject to movement

shall be cleaned to remove all unsound material so a solid fixed surface is established and patched with non-shrink patching mortar. If any reinforcing is exposed, a corrosion inhibiting product shall be used to coat the steel prior to patching.

4. Manhole Walls: The thicknesses of the patches, coatings, etc. must form a uniform, vertical wall established from the manhole bench to the manhole conesection.
 5. Flow Control: The Contractor shall be responsible for Wastewater Flow Control in accordance with 01520 Sewer Flow Control.
 6. The Contractor shall remove all foreign material, loose grout, debris and rubble from the existing channel. The Contractor shall rebuild the existing channel, if required, by reshaping or repairing the slope of shelves or benches. Manhole rehabilitation work shall include aligning inflow and outflow ports to prevent the deposition of solids at the transition point. All troughs shall follow the grades of the pipe entering the manhole. Changes in direction of the sewer and entering branch or branches shall have a true curve as large a radius as the size of the manhole will permit, but will be shaped to allow easy entrance of maintenance equipment including buckets, T.V. camera, etc.
 7. Manhole steps: The Contractor shall remove all manhole steps prior to rehabilitation. No steps shall be installed after rehabilitation.
 8. Each lining system shall be installed in accordance with the manufacturer's recommendation to withstand groundwater pressures. For manholes greater than twelve (12) feet in depth, the lining shall be capable of withstanding the pressures associated with a groundwater depth equal to the manhole depth. Linings for all other manholes shall be capable of withstanding the pressures associated with groundwater depth of twelve (12) feet. The Contractor shall measure groundwater depth from manhole bench to top of ground surface.
- C. Application of products shall be by factory certified applicators. Submit confirming documentation of certification.

3.02 SPRAY APPLIED LIGHTWEIGHT STRUCTURAL REINFORCED CEMENT

- A. The surface prior to spraying shall be properly prepared and cleaned and be damp without noticeable free water droplets or running water. Materials shall be spray- applied to a minimum uniform thickness to insure all cracks, crevices, and voids are filled and a smooth surface remains after light troweling. The light troweling is performed to compact the material into voids and to set the bond.
- B. The first application shall have begun to take an initial set (disappearance of surface sheen, lasting from 15 minutes to 1 hour depending upon ambient conditions) before the second application to assure a minimum total finished thickness of 1/2 inch. The final finished thickness may need to be greater than the 1/2 inch recommended by the manufacturer to withstand groundwater pressures. A depth gauge shall be used during application, at various locations, to verify the required thickness. The readings are to be recorded in the Contractor's Daily Report The surface then shall be troweled to a smooth finish with care taken to not over trowel in a manner bringing additional water to the surface and weaken

it. The Contractor shall follow the manufacturer's recommendations.

- C. The bench covers used to catch debris and rebound shall be removed and the bench and trough sprayed so a gradual slope is produced from the walls to the trough with the thickness at the edge of the trough being no less than 1/2 inch. The wall-bench intersection shall be rounded to a uniform radius the full circumference of the intersection.
- D. No application shall be made to frozen surfaces or if freezing is expected to occur within the manhole for twenty-four (24) hours after application. If ambient temperatures are in excess of 95° F, precautions shall be taken to keep the mix temperature at time of application below 90° F, using ice if necessary. Contractor shall monitor and maintain the temperatures within the range required by the manufacturer. The contractor shall provide a hi/lo thermometer and record the readings in the daily report.
- E. The final application shall have a minimum of four (4) hours cure time before being subjected to active flow.

3.03 CENTRIFUGALLY CAST STRUCTURAL REINFORCED CEMENT

- A. The rotating casting applicator shall be positioned to evenly apply the material and be withdrawn at a rate to assure a final minimum thickness of 1/2-inch. The final finished thickness may need to be greater than 1/2-inch, as recommended by the manufacturer, to withstand groundwater pressures. A depth gauge shall be used during application, at various locations, to verify the required thickness. The readings are to be recorded in the Contractor's Daily Report. The surface shall be troweled to a smooth finish with care being taken to not over trowel in a manner bringing additional water to the surface and weaken it.
- B. The bench covers used to catch debris and rebound shall be removed and the bench and trough sprayed or hand applied so a gradual slope is produced from the walls to the trough with the thickness at the edge of the trough being no less than 1/2-inch. The wall-bench intersection shall be rounded to a uniform radius the full circumference of the intersection. The surface shall be troweled to a smooth finish with care taken to not over trowel in a manner bringing additional water to the surface and weaken it.
- C. No application shall be made to frozen surfaces or if freezing is expected to occur within the manhole for 24 hours after application. If ambient temperatures are in excess of 95° F, precautions shall be taken to keep the mix temperature at time of application below 90° F. Contractor shall monitor and maintain the temperatures within the range required by the manufacturer. The contractor shall provide a hi/lo thermometer and record the readings in the daily report.
- D. The final application shall have a minimum of one (1) hour cure time before being subjected to active flow.

3.04 EPOXY COATING

- A. The epoxy coating shall be applied onto the interior surfaces of the manhole to produce a smooth coating and yield the required minimum thickness. A depth gauge shall be used during application at various locations to verify the required

thickness. The readings are to be recorded in the Contractor's Daily Report.

- B. The epoxy resin shall be applied at the required recommended thickness. The application shall have a minimum of three (3) hours cure time at required temperatures before being subjected to active flow.
- C. Conduct and record WFT tests during application and have Tooke gauge (DFT) tests done after application. Also suggest that high voltage holiday tests be required contingent upon required millage. All tests shall be conducted at the contractor's expense, by an independent NACE certified technician, and shall be witnessed by the Owner's Representative. Results of tests to be provided to Owner's Representative. Owner reserves the right to verify testing. Results of Owner's test takes precedence.
- D. An epoxy putty or other surfacer recommended by the epoxy manufacturer shall be used as necessary to repair any slight surface irregularities prior to applying epoxy.
- E. The sloped surface of the manhole bench shall be made non-skid by broadcasting aluminum oxide or sand into the surface prior to gelatin/set.

3.06 MANHOLE REHABILITATION ACCEPTANCE

- A. All manholes rehabilitated using cement mortar lining, epoxy lining, or fiberglass insert lining, including repairs of active leaks shall be subject to testing using the vacuum test method. The Contractor shall follow the manufacturer's recommendations for proper and safe procedures. Vacuum testing manholes shall be performed after curing of linings. Any visible leakage in the manhole or structure, before, during, or after the test shall be repaired regardless of the test results.
- B. If the manhole fails the vacuum test, the Contractor shall perform additional repairs, at no additional cost to the Owner, and repeat the test procedures until obtaining satisfactory results.
- C. All pipes for vacuum testing entering the manhole shall be installed at the top access point of the manhole.
- D. A vacuum of ten (10) inches of mercury (Hg) (5.0 psi) shall be drawn on the manhole, and the time shall be measured for the vacuum to drop to nine (9) inches of mercury (Hg) (4.5 psi). Manholes will be considered to have failed the air test if the time to drop one (1) inch of mercury is less than what is shown in the following table:

Vacuum Test Timetable Manhole Diameter – Inches				
Depth - feet	48 inches	60 inches	72 inches	96 inches
4	30 sec.	30 sec.	30 sec.	30 sec.
8	30 sec.	30 sec.	32 sec.	38 sec.
12	30 sec.	39 sec.	48 sec.	57 sec.
16	40 sec.	52 sec.	64 sec.	76 sec.
20	50 sec.	65 sec.	80 sec.	95 sec.

24	60 sec.	78 sec.	96 sec.	114 sec.
+ Each 2'	+5 sec.	+6.5 sec.	+8.0 sec.	+9.5 sec.

- E. Manhole depths shall be rounded to the nearest foot. Intermediate values shall be interpolated. For depths above twenty-four (24) feet, the Contractor shall add the values listed in the last line of the table for each two (2) feet of additional depth.
- F. After the manhole rehabilitation work has been completed, the Owner's Representative shall visually inspect the manhole. The finished surface shall be free of blisters, "runs" or "sags" or other indications of uneven lining thickness. The finished surface shall not have any evidence of visible leaks.

3.07 MANUFACTURER CERTIFICATION

- A. The manufacturer should be on-site for 2 to 5 eight-hour days or more depending on project size to confirm the Contractor is doing the installation correctly.

3.08 CLEANUP

- A. After the work has been completed and all testing acceptable, the Contractor shall clean up the work area.
- B. All debris and excess materials not incorporated into the permanent installation shall be disposed of by the Contractor. The debris and liquids are to be disposed of properly in accordance with all applicable laws. The local municipality can furnish a letter to the landfill stating the Contractor is authorized to dispose of the non-hazardous materials. Debris and liquid type and quantities are to be tracked in the daily Contractor diary. Hauling and disposal costs will be borne by the Contractor.
- C. The work area shall be left in a condition equal to or better than prior condition. Disturbed grassed areas shall be seeded or sod placed as directed by the Owner's Representative at no additional cost to the Owner. The work site restoration work shall be completed in accordance with the requirements Section 02276 – Site Restoration and Erosion Control.

3.09 DOCUMENTATION

- A. The Contractor shall complete work on each asset as assigned via the Owner's Computerized Work Order Management system. Upon starting the work, the Contractor shall receive work orders as assigned by the Owner's Representative. The Contractor shall maintain and synchronize the status of each rehabilitation work order issued.

3.10 WARRANTY

- A. The Contractor shall guarantee the work for a warranty period of one (1) year from the date of final acceptance. If, at any time during the warranty period, any defect is identified, the Contractor shall make repairs acceptable and at no additional cost to the Owner. In this case, the Contractor shall warrant the work for one (1) year in addition to the warranty required by the Contract.

END OF SECTION

SECTION 03071

EPOXIES

PART 1 GENERAL

1.1 SUMMARY

Section Includes:

- A. Epoxy.
- B. Epoxy gel.
- C. Epoxy bonding agent.

1.2 RELATED SECTIONS

Section 03072 - Epoxy Resin/Portland Cement Bonding Agent.

1.3 REFERENCES

American Society for Testing and Materials (ASTM):

- A. D638 - Standard Test Method for Tensile Properties of Plastics.
- B. D695 - Standard Test Method for Compressive Properties of Rigid Plastics.
- C. D790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

1.4 SYSTEM DESCRIPTION

Performance Requirements:

- A. Provide epoxy materials that are new and use them within shelf life limitations set forth by manufacturer.
- B. Perform and conduct work of this Section in neat orderly manner.

1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's data completely describing epoxy materials.
- B. Quality Control Submittals:
 - 1. Manufacturer's installation instructions.

PART 2 MATERIALS

2.1 MATERIALS

- A. Epoxy: Water-insensitive 2-part type low viscosity epoxy adhesive material containing 100 percent solids and meeting or exceeding following characteristics when tested in accordance with standards specified: Manufacturers: One of the following or equal:

1. Master Builders, Inc., Concessive Standard LVI.
2. Sika Chemical Corp., Sikadur 35 Hi-Mod LV.

Physical Characteristic	Test Method	Required Results
Tensile Strength	ASTM D638	8,000 pounds per square inch minimum at 14 days and 77
Flexure Strength	ASTM D790	11,000 pounds per square inch minimum at 14 days and 77
Compressive Strength	ASTM D695	16,000 pounds per square inch minimum at 24 hours and 77 degrees Fahrenheit cure.
Bond Strength	--	Concrete shall fail before
Gel Time for 5 Mil Film	--	Four hours maximum at 77 degrees Fahrenheit.
Elongation	ASTM D638	1 percent minimum at 14 days and 77 degrees Fahrenheit.

- B. Epoxy Gel: Manufacturers: One of the following or equal:

1. Sika Chemical Corp., Sikadur 31, Hi-Mod Gel.

- C. Epoxy Bonding Agent: Manufacturers: One of the following or equal:

1. Master Builders, Inc., Concessive 1001 Liquid LPL.
2. Sika Chemical Corp., Sikadur 32, Hi-Mod.
3. If increased tack time is required for concrete placement, epoxy resin -Portland cement bonding agent as specified in Section 03072 may be used instead of epoxy bonding agent.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install and cure epoxy materials in accordance with manufacturer's installation instructions.

B. Epoxy:

1. Apply in accordance with manufacturer's installation instructions.

C. Epoxy Gel:

1. Apply in accordance with manufacturer's installation instructions.
2. Use for vertical or overhead work, or where high viscosity epoxy is required.
3. Epoxy gel used for vertical or overhead work may be used for horizontal work.

D. Epoxy Bonding Agent:

1. Apply in accordance with manufacturer's installation instructions.
2. Bonding agent will not be required for filling form tie holes or for normal finishing and patching of similar sized small defects.

END OF SECTION

SECTION 03100**CONCRETE****PART 1: GENERAL****1.01 DESCRIPTION**

This section describes the submittal, material, installation, and testing requirements for furnishing and placing formwork, reinforcement, waterstops, concrete and lightweight (perlite) concrete. It also describes finishing and curing requirements, placement tolerances, and testing and repair procedures.

Except as otherwise provided herein, the design and erection shall be in accordance with the applicable provisions of ACI 318 and the concrete "Manual of Standard Practice".

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 02200: Earthwork
- B. Section 02225: Structure Excavation & Backfill
- C. Section 03480: Precast Utility Vaults and Catch Basins
- D. Section 03700: Concrete Saw Cutting and Core Drilling
- E. Section 05120: Structural Steel
- F. Section 05500: Metal Fabrications
- G. Section 09900: Painting

1.03 GOVERNING COSTS AND STANDARDS

Furnish and installing concrete shall conform to the following:

ACI	American Concrete Institute, 318
ACI	ACI Manual of Standard Practice
CRSI	Concrete Reinforcing Steel Institute
SS90	State Standard Specification 90
ASTM	Applicable Standards

1.04 SUBMITTALS: In accordance with Section 01300.

- A. Formwork Shop Drawings

1. Before starting concrete work, submit shop drawings of formwork showing size and thickness of members, dimensions and locations of openings and blockouts, vertical limits of concrete placements, horizontal lifts, plywood form pattern, proposed construction joints, form tie elevations and details, and any architectural features to be cast into the concrete. Incorporate the work of all trades. This review is for the purpose of assessing the Contractor's interpretation of the Contract Documents and will not include any considerations of the suitability, constructability, or safety of the concrete forming system.
2. Submit drawings and structural calculations for all concrete other than slabs on grade. Formwork drawings shall be signed and sealed by a Civil or Structural Engineer registered in California. Where superplastizers are used, design formwork to resist full liquid head.
3. The Contractor shall be solely responsible for the design, installation, use, and safe removal of all formwork. The formwork design shall comply with all governing codes, all Federal, State, and local ordinances; and generally accepted engineering principles.
4. Submit drawings showing the installation and removal sequence and procedures to be used. Include weight of formwork, assumed construction load, proposed minimum concrete strength for stripping of formwork, size and type of reshores, reshore spacing pattern, number of levels of reshores, and assumed load per reshore at each level.

B. Concrete

1. Prepare and submit proposed mix designs along with certified test results verifying that the components and final products meet the requirements of ACI 318 (latest edition) and these specifications.
2. Provide certificates that the cement used complies with ASTM C150 and these specifications.
3. Provide delivery tickets for ready-mix concrete or weighmaster certificates per ASTM C94, including cement weights, aggregate size, the amount of water added at the plant and record of pours. Record the amount of water added on the job on the delivery ticket. Water added at the plant shall account for moisture in both the coarse and fine aggregates.
4. Provide certificate of compliance from the manufacturer of the concrete admixtures with these specifications.
5. Provide epoxy bonding compound manufacturer's specific instructions for use. Provide manufacturer's certifications as to suitability of product to meet job requirements with regard to surface preparation, pot life, set time, vertical or horizontal application, corrosive and/or submerged environments and forming restrictions.

C. Reinforcing Steel Shop Drawings

1. Before starting concrete work, submit drawings complying with requirements of ACI 318 (latest edition), detailed in accordance with ACI SP66, and adapted to the proposed placement schedule, showing size, dimension, bending, placing, and construction joint details. Submit drawing showing locations of all construction joints. Submit type, size, and location of all slab and bar supports. Shop fabrication shall not begin until corrected drawings bearing the Engineer's review stamp are returned in accordance with Section 01300.
2. The Contractor shall be wholly and completely responsible for the accuracy of the lists and for furnishing and placing reinforcing steel in accordance with the details shown on the plans and as specified.
3. Submit certified copies of mill test reports for each lot or heat of all reinforcing steel.

D. Shoring: If shoring the structure is required, submit drawings and structural calculations signed and sealed by a Civil or Structural Engineer registered in the State of California showing anticipated loads, members, connections, and anchorage of the proposed shoring system.

E. Concrete Joints and Waterstops

1. Submit manufacturer's literature, catalog data, and statement of compliance with referenced standard and specifications for materials specified herein.
2. Submit material samples of PVC waterstops.
3. Provide technical data sheets for the Contractor's personnel and the Owner covering joint preparation, priming, and sealant materials application.
4. Submit layouts for construction and expansion joints and proposed pour sequence. Unless otherwise noted, maximum length or width of one pour is 30 feet and a maximum area of 600 sf. Where walls meet at a corner, the maximum length of wall from the corner to a construction or expansion joint is 20 feet.

PART 2: MATERIALS

2.01 CONCRETE

- A. General: Materials shall conform to State Specifications Section 90 and these specifications.
- B. Portland Cement: Use domestic portland cement that conforms to State Specifications "Type II Modified". Use only one brand of cement in any individual structure. Do not use cement that is damaged, partially set, lumpy, or caked. Reject the entire contents of the sack or container that contains such cement. Do not use salvaged or reclaimed concrete.

- C. Water: Water for washing aggregates and for mixing and curing concrete shall be clean, free from oil, acid, alkalis, vegetable matter, or other deleterious substances. No salt or sea water or water containing excessive amount of sodium sulphate, magnesium sulphate or magnesium chloride shall be used.
- D. Coarse Aggregate: The coarse aggregate shall consist of clean, hard, dense, tough and durable natural gravel, crushed gravel, or crushed rock, conforming to State Specifications. It shall be free from oil, organic matter or other deleterious substances.
- E. Fine Aggregate: Fine aggregate shall consist of hard, durable, uncoated natural sand or other approved material, conforming to State Specifications. It shall be free from oil or other deleterious substances.
- F. Fly Ash: Fly ash shall conform to ASTM A618, Class F or N, except that the loss on ignition shall be limited to 1%.
- G. Admixtures
 - 1. A water reducing agent such as Pozzoloth, WRDA, or equal shall be used in all concrete. The admixture shall conform to ASTM C494. Proportioning and mixing shall be as recommended by the manufacturer.
 - 2. Admixtures causing accelerated setting of cement in concrete shall not be used.
 - 3. Air entraining admixtures with demonstrated compatibility with the concrete mix shall be used as required as a moderate addition to the water reducing agent to obtain the specified percent air in the resultant concrete. The Contractor shall submit data verifying that the admixtures are compatible with the mix. Air-entraining admixture shall conform to ASTM C260.

2.02 REINFORCING

- A. Reinforcing Steel Bars: Deformed Bars shall be in accordance with ASTM A615, including Supplementary Requirement S1, Grade 60, and free from rust, scale, oil, or frost. No. 3 bars may be Grade 40.
- B. Welded Wire Fabric: Shall be of gauge and mesh size shown and shall meet the requirements of ASTM A185 or ASTM A497 for smooth wire fabric. Wire fabric shall be free from rust, scale, oil, and frost.
- C. Reinforcement supported from formwork shall rest on Class 1 (plastic protected) bar supports, as specified in "Manual of Standard Practice" by the Concrete Reinforcing Steel Institute (CRSI), Chapter 3.

Reinforcement supported from the ground shall rest on 3-inch high precast concrete blocks not less than 4 inches square, and having a compressive strength equal to the specified compressive strength of the concrete being placed. The precast blocks shall have been cured as specified for concrete and shall contain soft steel wires embedded therein for fastening to the reinforcing.

D. Details of concrete reinforcement not shown on drawings shall be in accordance with CRSI Manual of Standard Practice.

E. Fibrous Reinforcing: Fibrous Reinforcing shall be 100% virgin polypropylene, MD Graded, fibers containing no reprocessed olefin materials. One and a half (1-½) pounds of fiber filaments per cubic yard shall be added at the time of batching.

1. Physical Characteristics

a. Specific Gravity: 0.91

b. Fiber Length: Multi-Design Gradation

2. Manufacturer: (or approved equal)

Fibermesh, A Division of Synthetic Industries

4019 Industry Drive

Chattanooga, TN 37416

(800) 635-2308

2.03 REINFORCING BAR COUPLERS

Reinforcing bar couplers shall be internally threaded to receive future threaded reinforcing bars or couplers. The couplers shall be cold-forged to the reinforcing bars or shall be internally threaded to receive threaded reinforcing bars. The ends of the reinforcing bars shall be upset before threading. Reinforcing bars not upset before threading may be used provided the bar size is increased one bar size. The entire assembly shall be capable of developing, in tension and compression, at least 125 percent of the specified yield strength of the bar. Provide plastic screw-caps to protect internal coupler threads.

2.04 PATCHING GROUT (Dry Pack)

Patching grout shall consist of neat Portland cement, water, and sand passing a No. 8 sieve. The ratio of cement to sand shall be one part Portland cement to two parts sand. Add sufficient water to form a damp formable consistency.

2.05 NONSHRINK GROUT

Nonshrink grout shall conform to the Corps of Engineers Specification for Nonshrink Grout, CRD-C588, and to these specifications. Use a nongas-liberating type, cement base, premixed product requiring only the addition of water for the required consistency. Grout shall be Masterflow 713, as manufactured by Master Builders Company, Cleveland, OH, Upcon by Upco Co., Cleveland, OH, or equal.

2.06 EPOXY GROUT

The epoxy shall consist of a two component bonding compound. Epoxy shall be Gantrex K3, GER Grout, Custom Building Products 100% solids epoxy, or equal.

2.07 JOINT MORTAR BED

Mortar or grout placed on horizontal construction joints shall be a mixture of cement, sand, and water in the same proportions used in the concrete but with the coarse aggregate omitted.

2.08 JOINT SEALANT

A. Joint sealant shall be a multipart, gray, nonstaining, nonsagging, polyurethane sealant, which cures at ambient temperature to a firm, flexible, resilient, tear-resistant rubber. Sealant shall meet U.S. Federal Specification TT-S-002277E(3) Type 1, Class A for horizontal joints and Type II, Class A for vertical and horizontal joints and, in addition, is recommended by the manufacturer for continuous immersion in water. Sealant shall be RC 270 of Products Research and Chemical Corporation, Mamico International Vulkem 227, Multi-Chem MC287, or equal.

B. Technical Requirements

Consistency	Gun grade
Tack free time	24 hours at 75 Degees F and 50% R. H.
Pot life	1 to 3 hours
Hardness	35 shore A, +/- 5
Elongation	500%
Tensile strength ASTM D412	300 psi
Peel strength on concrete	No loss of bond after 24 hours at 150% elongation
Temperature service	-40 degrees F to 155 degrees F
Immersion in water	Continuous

2.09 BACKING ROD FOR EXPANSION JOINTS

Backing rod shall be an extruded closed-cell polyethylene foam rod, such as Minicel backer rod, manufactured by Industrial Systems Department, Plastic Products Group of Hercules, Inc., Middletown, Delaware; Ethafoam SB, as manufactured by Dow Chemical Company, Midland, Michigan; or equal.
The rod shall be ¼-inch larger in diameter than the joint width. Where possible, provide full length sections for the joint and minimize splices. Apply backing rod and bond breaker tape in expansion

joints.

2.10 BOND BREAKER TAPE

Bond breaker tape shall be an adhesive-backed glazed butyl or polyethylene tape which will adhere to the premolded joint material or concrete surface. The tape shall be the same width as the joint. The tape shall be compatible with the sealant.

2.11 EXPANSION JOINT FILLERS (Walkways and Sidewalks)

Asphalt impregnated, premolded type, ASTM D1751, ½-inch by depth of slab minus ½-inch.

2.12 PREMOLDED JOINT FILLER

Joint filler shall be preformed, non-extruded type constructed of closed-cell neoprene conforming to ASTM D1752, Type I, as manufactured by W. R. Grace Company of Cambridge, MA; W. R. Meadows, Inc., Elgin, IL; or equal.

2.13 STEEL EXPANSION JOINT DOWELS

Steel expansion joint dowels shall conform to one of the following:

- A. Epoxy coated steel bar dowels with a 12-mil coating thickness. Steel bar dowels shall conform to ASTM A36 or ASTM A615, plain rounds, Grade 60. Epoxy coating shall be in conformance with ASTM A775; or,
- B. Stainless-steel bar dowels conforming to ASTM A276, Type 302.

2.14 EXPANDED POLYSTYRENE FILLER BLOCK

Expanded polystyrene filler blocks for future construction and expansion joints shall be Styrofoam SM brand as manufactured by Dow Chemical Company, or equal.

2.15 PREFORMED CONTROL JOINT

Preformed control joint shall be a one-piece, flexible, PVC joint former, such as Kold-Seal Zip-Per Strip KSF-150-50-50, manufactured by Vinylex, Corp., Knoxville, Tennessee, or a one-piece steel strip with preformed groove, such as Keyed Kold Retained Kap, manufactured by Burke Concrete Accessories, Inc., San Mateo, CA, or equal. Provide the preformed control joint material in full length unspliced pieces.

2.16 PVC WATERSTOPS

Waterstops shall be extruded from a PVC compound and shall be lock-rib, center-bulb or flat-strip type as manufactured by Greenstreak, Specon, Inc., JPSpecialties, Inc., or equal. Waterstop shall comply with Corps of Engineers Specification CRD-C-572. Waterstops shall be of the dimensions and profile as shown in the drawings.

Waterstops shall be extruded from virgin elastomeric PVC compound, resistant to chemical action with Portland cement, alkalies, acids, and not affected by mildew or fungi. It shall show no effect

when immersed for 10 days in a 10% solution of sulfuric or hydrochloric acid, saturated lime solution or salt water. Waterstops shall be such that any cross section will be dense, homogeneous, and free from porosity and other imperfections. Waterstops shall be symmetrical in shape. When tested in accordance with Federal Standard No. 601, the material shall meet the following minimum requirements:

Minimum Requirement	ASTM Specification
Tensile Strength, 2000 psi	D638
Shore hardness A15, 60-80	D2240
Ultimate elongation, 300%	D638
Water absorption, 0.15	D570
Specific gravity, 1.3	D792
Stiffness in flexure, 1000 psi	D747
Low temperature brittleness, -35 degrees F	D746
Tear Resistance, 300 lb/in	D624

2.17 BENTONITE WATERSTOPS

Where identified on the drawings, bentonite waterstops shall be bentonite strips, Volclay "Water Stop-RX", or equal.

2.18 FLOOR HARDENER

Liqui-Hard by W.R. Meadows; Lapidolith by Sonneborn Building Products, Division of Contech, Inc., Minneapolis, Minnesota, or equal. Hardener shall be compatible with curing method used.

2.19 ADHESIVE ANCHORS

Anchors called out on Drawings as epoxy anchor, adhesive anchor or chemical anchors shall be stainless steel threaded rods, nuts, and washers or Grade 60 rebar in two component resin adhesive. Adhesive shall be HILTI RE 500-SD, or equal. Adhesive anchors shall be suitable for submerged and corrosive environments.

2.20 STRUCTURAL ANCHORS

A. Anchors called out on the Drawings as expansion anchors (EA), expansion bolt (EB), or wedge anchor (WA) shall be Type 303 or 304 stainless steel ITW Readhead True Bolt+,

HILTI Kwikbolt TZ, or equal.

- B. Adhesive anchors may be substituted for structural anchors.

2.21 CURING MATERIALS

- A. Sheet Materials: ASTM C171, 4 mil polyethylene film or waterproof paper.
- B. Spray Applied Membrane Forming Liquids: Meet or exceed requirements of ASTM C309, Type 1-D, Class B, except that the loss of water, when tested, shall be not more than 0.15 kilograms per square meter in 24 hours, nor more than 0.45 kilograms per square meter in 72 hours. Shall be a water-base, resin cure with fugitive dye meeting California Air Regulation Board requirements. Products by Burke, W.R. Meadows, Inc., or equal.
- C. Burlap Mats: Burlap mats shall conform to AASHTO M182.

2.22 FORM TIES

- A. Locate form ties on exposed surfaces in a uniform pattern or as indicated on the drawings. Construct form ties so that the ties remain embedded in the concrete except for a removable portion at each end and do not leave an open hole through the concrete. Form ties shall have conical or spherical type inserts with a maximum diameter of 1 inch. Construct form ties so that no metal is within 1 inch of the concrete surface when the forms, inserts, and tie ends are removed. Do not use wire ties. Ties shall withstand all pressures and maintain forms within acceptable deflection limits.
- B. Flat bar ties for panel forms shall have plastic or rubber inserts having a minimum depth of 1 inch and sufficient dimensions to permit patching of the tie hole.

Notify Engineer 48 hours prior to placement of concrete. Concrete shall not be placed until Engineer has reviewed and approved the placement of all reinforcing steel.
- C. Ties for water-holding structures or dry structures with access, such as basements or pipe galleries that are below finish grade, shall have an integral steel waterstop that is tightly and continuously welded to the tie. The waterstop shall be at least two times larger in the area than the tie cross-sectional area and shall be oriented perpendicular to the tie and symmetrical about the center of the tie. Construct the ties to provide a positive means of preventing rotation or disturbance of the center portion of the tie during removal of the ends.
- D. Tapered form ties shall be tapered through-bolts at least 1 inch in diameter at the smallest end or through-bolts that utilize a removable tapered sleeve of the same minimum size.

2.23 BONDING AGENT

Concresive 1001-LPL, manufactured by Adhesive Engineering Company, San Carlos, CA, No. 705 Bonding Adhesive, Upco Co., Cleveland, OH, or equal.

PART 3: EXECUTION

3.01 CONCRETE MIX COMPOSITION

- A. Concrete Composition: Concrete shall consist of Portland cement, fine aggregate, coarse aggregate, an air entraining agent, and water which shall conform to the requirements of Section 90 of the State Specifications, and as modified herein.
- B. Submittal of Proposed Mix Design
1. The proposed mix design, with samples or rock aggregate and any admixtures to be used shall be submitted in accordance with Section 01300.
 2. The grading or proportioning of the fine and coarse aggregates in the mix shall be changed whenever necessary or desirable, in the opinion of the Engineer, to secure the required economy, workability, density, impermeability or strength, and no additional compensation because of such changes shall be allowed.
- C. Concrete Designations: Concrete will be designated by Class (per State Specifications), cement factor in pounds per cubic yard, or by 28-day compressive strength.

Table One

CONCRETE SUMMARY

Type of Use	Concrete Class	Maximum Aggregate Size	Minimum Compression Strength at 28 Days	Slump Inches	Max. Water Cement Ratio (by weight)	Entrained Air Required
LIQUID CONTAINING STRUCTURES:						
Slabs & Footings on grade	A	1 ½"	4000	2 to 3	0.45	4-½% ±1%
Vertical Wall Sections & Columns	A	1"	4000	3 to 4	0.45	5% ±1%
Mass Concrete & Unformed Slopes	A	1"	4000	1 to 2	0.45	5% ±1%
OTHER STRUCTURAL CONCRETE:						
Interior & Exterior Slabs, Footings,	A	1 ½"	4000	2 to 3	0.45	4-½%

and Caissons						±1%
Vertical Wall Sections & Columns	A	1"	4000	3 to 4	0.45	5% ±1%
CURBS, GUTTERS, SIDEWALKS, MOWING STRIPS, FENCE POSTS	B	1"	2500	3 to 4	0.55	5% ±1%
PIPE BEDDING, THRUST BLOCKS, CONCRETE FILL	C	1"	2000	3 to 4	0.60	-----
LIGHTWEIGHT (PERLITE) CONCRETE	see Item 4 below	1/8"		7		5% ±1% *

D. Concrete Class

1. Class A concrete shall contain a minimum of 658 pounds of Portland cement per cubic yard.
2. Class B concrete shall contain a minimum of 470 pounds of Portland cement per cubic yard.
3. Class C concrete shall contain a minimum of 376 pounds of Portland cement per cubic yard.
4. Lightweight (perlite) concrete shall be as specified in Part 3.01 H below.

E. Concrete Compressive Strength

1. Whenever the 28-day compressive strength shown on the plans is 3,500 pounds per square inch or greater, the concrete shall be considered to be designated by compressive strength.
2. When the concrete is designated by compressive strength the mix proportions shall be determined and concrete shall be furnished which contains not less than 564 pounds and not more than 800 pounds of cement per cubic yard of concrete and which conforms to the strengths shown on the plans or as specified.
3. Batch proportions shall be adjusted as necessary to produce concrete having the

specified cement factor.

F. Fly Ash

The Contractor may at his option substitute up to 15 percent by weight of fly ash for the Portland cement required herein.

G. Aggregate Sizing

1. Coarse aggregate maximum grading shall be as specified in Table 1. Grading shall be as set forth in Section 90 of the State Specifications.
2. Where the spacing of reinforcing bars is such as to result in minimum clearances, or in other locations where in the opinion of the Engineer difficulties may be experienced in pouring concrete with 1½-inch maximum size aggregate, concrete with 1-inch maximum size aggregate shall be used. In this event the air content shall be increased by ½%.

H. Lightweight (Perlite) Concrete

1. Concrete shall contain #1 size perlite, cement, water and air entraining agent. Mix design shall be 1 part cement, 6 parts perlite by volume to yield a wet density of 40.5#/ft³ (±3#) and a dry density of 27#/ft³ (±3#). Mix design shall be as approved by the Engineer and in strict conformance with the Perlite Institute recommendations.
2. Concrete shall have a 28-day compressive strength of 125-200 psi.
3. Thermal conductivity “k” shall be 0.58 Btu-inch/h–ft²-F
4. Transport and placement shall be as approved by the Engineer and in strict conformance with the Perlite Institute recommendations. For example, perlite shall be added at the job site or mixer drum shall not rotate during transit.

3.02 MEASURING MATERIALS

Materials shall be measured by weighing except as otherwise specified or where other methods are specifically authorized by the Engineer. Scales shall be approved by the Engineer and have been certified by the local Sealer of Weights and Measures within one year of use. Each size of aggregate and the cement shall be weighed separately. The accuracy of all weighing devices shall be such that successive quantities can be measured to within one percent of the desired amount. Cement in standard packages (sacks) need not be weighed, but bulk cement and fractional packages shall be weighed.

3.03 CONCRETE MIXING & DELIVERY

- A. All concrete shall be machine mixed at the site, or delivered to the site by transit mixers under conditions approved by the Engineer.
- B. No concrete shall be placed in the work after it has started to set. No concrete can be placed more than one hour after it has been mixed.
- C. If transit mix is used, the rate of delivery, haul time, mixing time and hopper capacity shall be such that all mixed concrete delivered shall be placed in the forms within one hour from the time of introduction of cement and water to the mixer. All concrete shall be kept continuously agitated until discharged in the hopper at the job site.
- D. Ready-mixed concrete shall be batched, mixed, and transported in accordance with ASTM C94 and Chapter 7 of ACI 301. Plant equipment and facilities shall conform to the "Check List for Certification of Ready Mixed Concrete Production Facilities" of the National Ready Mixed Concrete Association.

3.04 CONCRETE HANDLING & PLACEMENT

A. Excavations and Formwork

- 1. Excavations shall be kept free from water while concrete is being placed, cured and finished therein. Fresh concrete shall be protected at all times from running water.
- 2. The order of placing concrete in all parts of the work shall be acceptable to the Engineer. In order to minimize the effects of shrinkage, the concrete shall be placed in units as bounded by construction joints shown. The placing of units shall be done by placing alternate units in a manner such that each unit placed shall have cured at least 5 days for hydraulic structures and 2 days for all other structures before the contiguous unit or units are placed, except that the corner sections of vertical walls shall not be placed until the 2 adjacent wall panels have cured at least 10 days for hydraulic structures and 4 days for all other structures.
- 3. Before placing concrete, all form work shall be cleaned of dirt and construction debris, water-drained, reinforcement securely and properly fastened in its correct position, forms at construction joints re-tightened, all ducts, sleeves, hangers, pipes, conduits, bolts, wires, etc., installed. No concrete shall be placed before the forms and all work that is to be embedded have been set and observed by the Engineer.

B. Concrete Placement

- 1. The working schedule and schedule of placement shall be as shown on the plans and worked out in conjunction with the Engineer. The schedule shall be worked out prior to commencement of work, and shall be rigidly adhered to.
- 2. Concrete shall be conveyed from the mixer to the place of final deposit as rapidly as practicable by methods which will prevent the separation or loss of the materials. The concrete shall be deposited in the forms as nearly as practicable in

its final position to avoid rehandling.

3. Concrete shall be placed and consolidated by methods that will not cause segregation of the aggregates and will result in a dense homogeneous concrete which is free of voids and rock pockets. All concrete shall be used while fresh and before it has taken an initial set. Retempering any partially hardened concrete with additional water will not be permitted.
4. Surfaces on which concrete is to be placed shall be dampened with water immediately before placing concrete.
5. Concrete shall not be deposited on frozen or ice-coated ground nor on ice-coated forms, reinforcing steel, embedded items or construction joints.
6. Where pavement or surfacing is to be placed around or adjacent to manholes or drainage inlets which will be located within traffic lanes, such structures shall not be constructed to final grade until after the pavement or surfacing has been placed around these locations.
7. Where a schedule for placing concrete is shown on the plans no deviation will be permitted therefrom unless approved in writing by the Engineer.
8. Mixed concrete, after being deposited, shall be consolidated until all voids are filled and free mortar appears on the surface. The concrete shall be placed as nearly as possible in its final position and the use of vibrators for extensive shifting of the mass of fresh concrete will not be permitted.

Except for concrete used in cast-in-place piles, fresh concrete shall not be permitted to fall from a height greater than 4 feet without the use of adjustable length pipes, tubes or double belting placed to prevent segregation of the concrete. Double belting shall not be used unless the thickness of the member is less than 16 inches.

9. In vertical sections, concrete shall be deposited continuously in horizontal layers of 24 inches maximum depth so as to maintain a horizontal plastic surface until the completion of the unit. No concrete shall be deposited on concrete which has hardened sufficiently to cause the formation of seams and planes of weakness within the section.
10. Concrete for horizontal members or sections shall not be placed until the concrete in the supporting vertical members or sections is no longer plastic and has been in place at least two hours.
11. In all slabs, concrete shall be deposited in a continuous or monolithic operation to the full thickness of the slab. Each batch shall be dumped against previously placed concrete and not away from it, and shall not be dumped in separate piles and then worked together.
12. The concrete in each integral part of the structure shall be placed continuously, and

work will not be allowed to commence on any such part unless sufficiently inspected and approved material for the concrete is on hand, and forces and equipment are sufficient to complete the part without interruption in the placing of the concrete.

C. Concrete Vibrating

1. Consolidate concrete by means of high frequency internal vibrators within 15 minutes after it is deposited in the forms. The vibrators shall not be attached to or held against the forms or the reinforcing steel. The vibrating shall be done with care and in such manner that displacement of reinforcement, ducts, and embedded items is avoided.
2. All concrete shall be consolidated by vibration so that the concrete is thoroughly worked around the reinforcement, around embedded items, and into corners of forms, eliminating all air or stone pockets which may cause honeycombing, pitting, or planes of weakness. Internal vibrators used shall be the largest size and the most powerful that can be properly used in the work, as described in Table 5.1.4 of ACI 309. They shall be operated by competent workmen. Use of vibrators to transport concrete within forms shall not be allowed. The vibrator shall be inserted vertically at uniform spacing over the entire area of the placement. The distance between insertions shall generally be about 1½ times the radius of action, or such that the area visibly affected by the vibrator overlaps the adjacent just-vibrated area by a few inches. In slabs, the vibrator shall be sloped toward the horizontal as necessary to operate in a fully embedded position.
3. The vibrator shall penetrate rapidly to the bottom of the layer, and at least 6 inches into the preceding layer if there is such. At each insertion, the vibrator shall be held stationary for a time sufficient to consolidate the concrete but not cause segregation, generally from 5 to 15 seconds. The vibrator shall then be withdrawn slowly, at the rate of approximately 3 inches per second.
4. A spare vibrator in good working condition shall be kept on the job site during all concrete placing operations. Where the concrete is to have an as-cast finish, a full surface of mortar shall be brought against the form by the vibration process, supplemented if necessary by spading to work the coarse aggregate back from the formed surface.
5. The use of external vibrators for consolidating concrete will be permitted when the concrete is inaccessible for adequate consolidation provided the forms are constructed sufficiently rigid to resist displacement or damage from external vibration.

D. Cold Weather Requirements

1. Provide adequate equipment for heating concrete materials and protecting concrete during freezing or near-freezing weather in accordance with ACI 306 and the following paragraphs.

2. When the temperature of the surrounding atmosphere is 40 degrees F or is likely to fall below this temperature, use heated mixing water not to exceed 140 degrees F. Do not allow the heated water to come in contact with the cement before the cement is added to the batch.
3. When placed in the forms during cold weather, maintain concrete temperature at not less than 55 degrees F for the first five days after placing, and above 35 degrees F for the remainder of the curing period. Provide thermometers to indicate the ambient temperature and the temperature 2 inches inside the concrete surface.
4. There will be no additional reimbursement made to the Contractor for costs incurred for placing concrete during cold weather.

E. Hot Weather Requirements

1. During hot weather, give proper attention to ingredients, production methods, handling, placing, protection, and curing to prevent excessive concrete temperatures or water evaporation in accordance with ACI 305 and the following paragraphs.
2. When the weather is such that the temperature of the concrete as placed would exceed 90 degrees F, use ice or other means of cooling the concrete during mixing and transportation so that the temperature of the concrete as placed will not exceed 90 degrees F.
3. Take precautions when placing concrete during hot, dry weather to eliminate early setting of concrete. This includes protection of reinforcing from direct sunlight to prevent heating of reinforcing, placing concrete during cooler hours of the day, and the proper and timely application of specified curing methods.
4. There will be no additional reimbursement to the Contractor for costs incurred for placing concrete in hot weather.

3.05 BONDING TO EXISTING CONCRETE

Coat the contact surface with epoxy bonding compound. The method of preparation and application of the bonding compound shall conform to the manufacturer's printed instructions and recommendations for specific application of the product.

3.06 FORMWORK

- A. Arrange formwork construction to allow for proper sequencing and removal without damage. Use orderly and symmetrical panel arrangement with minimum number of joints. Before proceeding, secure approval of formwork and procedures.
- B. Lumber, prefabricated wood panels, metal, or plastic-lined panels shall be sound and free from any defects that will mar or detract from the surface of the finished concrete. Construct forms sufficiently tight to prevent loss of mortar. Design forms to withstand vibrator action. Treat forms with a nonstaining material to eliminate absorption of water

and to act as a form release agent.

- C. Thoroughly remove all dirt, mortar, and foreign matter before each use. Where the bottom of the form is inaccessible from within, provide access panels to permit thorough removal of extraneous material before placing concrete.
- D. Kerf wood forms inserted for architectural treatment to accommodate swelling without pressure on the concrete.
- E. Chamfer all exposed horizontal and vertical edges or other corners $\frac{3}{4}$ -inch, both interior and exterior of structures.
- F. Earth trench forms for walls and footings below existing and final grades may be used, if approved after inspection of the trenches, provided the sides are clean, even, vertical, true, and provided the bottoms are level, clean, and without fill, and the width is increased two (2) inches.
- G. Where tolerances are not shown elsewhere, permissible deviations from established lines, grades, and dimensions are listed below:

1. Variation from the Plumb

- a. In the lines and surfaces of columns, piers, walls and in arises: in 10 feet, $\frac{1}{4}$ -inch; in any story or 20 feet maximum, $\frac{3}{8}$ -inch; in 40 feet or more, $\frac{3}{4}$ -inch.
- b. For exposed corners and other conspicuous lines: in any bay or 20 feet maximum, $\frac{1}{4}$ -inch; in 40 feet or more, $\frac{1}{2}$ -inch.

2. Variation from the Level or from the Grades Shown

- a. In floors, ceilings, and beam soffits: in 10 feet, $\frac{1}{4}$ -inch; in any bay or 20 feet maximum, $\frac{3}{8}$ -inch; in 40 feet or more, $\frac{3}{4}$ -inch; in floors to receive tile, maximum of $\frac{1}{8}$ " in 10 feet.
- b. For exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines: in any bay or 20 feet maximum, $\frac{1}{4}$ -inch; in 40 feet or more, $\frac{1}{2}$ -inch.

- 3. Variation of the linear building lines from established position in plan and related position of columns, walls and partitions: In any bay or 20 feet maximum, $\frac{1}{2}$ -inch; in 40 feet or more, 1 inch.
- 4. Variation in tank, channel or structural lines in 10 feet, $\frac{1}{4}$ -inch; in 20 feet, $\frac{3}{8}$ inch; in 40 feet or more, $\frac{1}{2}$ -inch.
- 5. Variation in the sizes and locations of sleeves, floor openings and wall openings: $\frac{1}{4}$ -inch.

6. Variation in cross-sectional dimensions of columns, beams and piers, and in the thickness of slabs and walls: minus, 1/4-inch; plus, 3/8-inch.
7. Footings
 - a. Variation in Dimensions in Plan: Minus, 1/2-inch; plus, 2-inch.
 - b. Misplacement or Eccentricity: 2 percent of the footing width in the direction of misplacement but not more than 2 inches.
 - c. Misplacement or Eccentricity of Footings Supporting Masonry Or Concrete: 1/2-inch.
 - d. Reduction in Thickness: Minus 5 percent of specified thickness.
8. Variation In Steps
 - a. In a Flight of Stairs: rise, 1/8-inch; tread, 1/4-inch.
 - b. In Consecutive Steps: rise, 1/16-inch; tread, 1/8-inch.
9. Variation from established lines and grades in sidewalks, plazas, outdoor concrete slabs, curb and gutter sections: in 10 feet, 1/4-inch; in 1 foot, 1/8-inch.

Where tolerances are not met, the Owner's Representative may require removal and replacement at no cost to the Owner.

3.07 REINFORCEMENT

- A. Design: The reinforcement design shown on drawings shows only the necessary information for detailing the reinforcement and preparing placing and bending details. Prior to starting concrete work, submitted detailed shop drawings shall be approved.
- B. Bending: In accordance with CRSI Manual of Standard Practice, Chapter 7.
- C. Placement: Place reinforcement accurately as shown. Adequately secure metal reinforcement in position by concrete or metal chairs and spacers, in accordance with CRSI Manual of Standard Practice, Chapter 8. Distance between the steel and the surface, as shown; otherwise, in accordance with Chapter 8. In walls, use bolsters between form and reinforcement to prevent lateral displacement of reinforcement and to insure proper concrete cover.
- D. Splices: Locate splices of reinforcement as shown. For any splices not shown, assume Class B splice. Stagger splice in adjacent horizontal bars. Lap adjacent sheets of wire mesh a minimum of 6 inches and wire securely.
- E. Inspection: After reinforcement has been placed, it shall be inspected and approved before placing concrete.

- F. Conditions of Surfaces: At time concrete is placed, all metal reinforcement shall be free from rust, scale, frost, or other coatings that would destroy or reduce the bond.
- G. Welding Reinforcement: Do not weld reinforcing steel unless specifically approved by the Engineer. Welding to be in accordance with ASTM A706.

3.08 JOINTS AND EMBEDDED ITEMS

A. Construction Joints

1. Obtain approval for joints not shown and locate them where they least impair the strength of the structure. Unless otherwise shown on the drawings, joints in walls and columns shall be at the underside of floors, slabs or beams, and at the top of footings or floor slabs. Place beams at the same time as slabs. At least two hours shall elapse after depositing concrete in columns or walls before depositing concrete in supported beams or slabs. As the new concrete is placed, re-vibration in tops of columns and walls is desirable. Make joints perpendicular to the main reinforcement.
2. All horizontal construction joints in walls shall have a continuous wood screed strip at the outer face of joint to form a true line. Screeds shall be removed and the reglet thoroughly cleaned out before pouring the next portion of wall.
3. Continue all reinforcing steel and mesh across construction joints.
4. Construction joints shall be made rough and all laitance removed from the surface by chipping the entire surface, sandblasting with coarse silica sand, or hosing the surface 4 to 6 hours after the pour with a fine spray, exposing solidly embedded clean aggregate.

Forms and reinforcing shall likewise be cleaned of drippings, debris, etc., by means of compressed air. Surfaces of the hardened concrete shall be cleaned to the satisfaction of the Engineer and wet as required before placing of new concrete. Just before starting the new pour, all free water shall be removed and the horizontal surfaces shall be covered with at least a 4-inch thickness of concrete composed of cement and fine aggregate, omitting the coarse aggregate.

B. Expansion Joints

1. Install expansion joint fillers to ½-inch below slab.
2. Where shown, load transfer dowels shall consist of plain bars with one half coated with an approved antibond coating. The coated half shall be sleeved. No other reinforcement or metal shall extend continuously through the joint.

C. Waterstops

1. The design and location of waterstops shall be as shown on the drawings and in these specifications. Each piece of premolded waterstop shall be of maximum

practicable length to minimize the number of end joints.

2. PVC waterstops shall be properly heat spliced at the ends and intersections to ensure continuity. Construct forms for construction joints in such a manner as to prevent injury to waterstops. Allow at least 10 minutes before pulling or straining the new splice in any way. The finished splices shall provide a cross section that is dense and free of porosity with tensile strength of not less than 80% of the unspliced materials.
3. Install waterstops in strict conformance with manufacturer's recommendations.
4. Support waterstops securely against displacement using approved adhesives, or methods specifically recommended by the manufacturer. Hold PVC waterstops securely in position in the construction joints by wire ties, continuous bars, and rings as necessary and approved by the Engineer. Install waterstops in construction and expansion joints in hydraulic structures or where shown in the drawings.
5. If joint is not watertight after construction, one or both of the following shall be done to provide a watertight joint:
 - a. Grouting of the joint by drilling grout holes to the center of the structure unit and forcing epoxy grout into the joint under pressure.
 - b. Cutting of a bevel groove on the water side of the joint. The groove shall be ½ to ¾-inch in width and depth and shall be caulked with epoxy joint sealer in accordance with manufacturer's instructions.

D. Other Embedded Items

1. Prior to concreting, place all required sleeves, inserts, anchor bolts and embedded items.
2. Give all trades whose work is related to the concrete ample notice and opportunity to introduce embedded items before concrete is placed.
3. Position expansion joint material, waterstops, and embedded items accurately and support them against displacement. Fill voids in sleeves, inserts, and anchor slots temporarily with readily removable material to prevent the entry of concrete.

E. Pipes and Wall Spools Cast in Concrete

1. Install wall spools (i.e. bell ring inserts), wall flanges, and wall anchors before placing concrete. Do not weld, tie, or otherwise connect the wall spools or anchors to the reinforcing steel.
2. Support pipe and fabricated fittings to be encased in concrete on concrete piers or pedestals. Carry concrete supports to firm foundations so that no settlement will occur during construction.

3. Pipes or spools located below operating water level shall have waterstop ring collars and shall be cast in place. Do not block out such piping and grout after the concrete section is cast. Pipes fitted with thrust rings shall be cast in place.

F. Additional Reinforcement Around Openings

Place additional reinforcement around pipe or openings as indicated in the drawings

3.09 FORM REMOVAL

Carefully remove forms to insure the complete safety of the structure. Where the structure is supported by shoring, the beam sides, columns, or other vertical forms may be removed after 36 hours, providing the concrete will not be injured. All supporting forms shall remain in place for a minimum of 10 days. Do not remove supporting forms or shoring until members have acquired sufficient strength to support their weight and imposed loads safely.

3.10 CONSTRUCTION LOADS ON STRUCTURAL SLABS

If shoring is removed, no construction materials and equipment shall be allowed on structural slabs until the concrete has reached the 28-day compressive strength. All superimposed construction loads will then be limited to the design load of the slab.

3.11 REPAIRING AND PATCHING

- A. Clean, thoroughly dampen and patch all tie holes and all repairable defects immediately after form removal.
- B. All honeycombed and other defective concrete shall be removed to sound concrete with edges perpendicular to the surface. Surface imperfections greater than 3/8 inch in any dimension shall be removed and the affected areas neatly patched. Dampen the area to be patched and an area at least 6 inches wide surrounding it to prevent absorption of water from the patching mortar. Mix patching grout to the consistency of thick cream and brush it well into the surface.
- C. Make the patching mortar of the same material and approximately the same proportions as used for the concrete, omitting the coarse aggregate. The resultant mortar shall consist of not more than 1 part cement to 2½ parts sand by damp loose volume.
- D. Do not use more mixing water than necessary for handling and placing. Mix the patching mortar in advance and allow to stand with frequent manipulation with a trowel, without adding water, until it has reached the stiffest consistency that will permit placing.
- E. After surface water has evaporated from the area to be patched, brush the patching grout well into the surface. When the patching grout begins to lose the water sheen, apply the premixed patching mortar. The mortar shall be thoroughly consolidated into place and struck off to leave the patch slightly higher than the surrounding surface. To permit initial shrinkage, leave the patch undisturbed for at least 1 hour before finishing it. Keep the patched area damp for 7 days. Do not use metal tools in finishing a patch in a formed wall which will be exposed.

- F. Tie Holes: Clean thoroughly, dampen, then fill solid with patching mortar. Mortar shall match color of concrete. Fill tie holes prior to finishing.

3.12 FINISHES FOR SURFACES

- A. Finish 1: Beams, columns, and exterior walls not exposed to water or view: Repair defective concrete, fill depressions deeper than ½ inch, and fill tie holes.
- B. Finish 2: Exterior and interior walls, beams, and columns exposed to water, unless such items are to be coated: Repair defective concrete, remove fins, fill depressions ¼ inch or deeper, and fill tie holes.
- C. Finish 3: Walls, beams, and columns of structures or buildings exposed to view and to 1 foot below water level or finished grade; underside of formed floors or slabs (EXCEPT - surfaces which are to be coated): In addition to Finish 2, fill depressions and airholes with mortar. Dampen surfaces and then spread a slurry consisting of one part cement and one and one-half parts sand by damp loose volume, over the surface with clean burlap pads or sponge rubber floats. Remove any surplus by scraping and then rubbing with clean burlap (sacked finish).
- D. Finish 4: Exterior and interior surfaces to be coated: Repair defective concrete, remove fins, fill depressions 1/16 inch or deeper, fill tie holes, remove mortar spatter, and remove bulges higher than 1/16 inch. Surface shall be trowelled, sacked, and brush blasted.
- E. Finish 5: Slabs and floors to be covered with concrete or grout: Screed to grade without special finish.
- F. Finish 6: Slabs and floors not water bearing: Repair defective concrete, remove fins, fill depressions ¼ inch or deeper, and fill tie holes.
- G. Finish 7: Slabs and floors which are water bearing; Slab surfaces on which mechanical equipment moves; Slab surfaces to receive hardener: Steel trowel finish, free from trowel marks and all irregularities.
- H. Finish 8: Slabs and floors of structures or buildings exposed to view: Steel trowel finish without local depressions or high points and apply a light hair-broom finish. Do not use stiff bristle brooms or brushes. Leave hair-broom lines parallel to the direction of slab drainage.
- I. Finish 9: Slabs and floors at slopes greater than 10% and stairs: Steel trowel finish without local depressions or high points. Apply a coarse broom finish. Leave broom lines parallel to the direction of slope drainage.
- J. Finish 10: Exposed stairs and landings and slabs designated for non-slip finish: Areas to have non-slip finish shall incorporate 25 pounds per 100 square feet of aluminum oxide grains into the surface. Immediately before floating begins, sprinkle two-thirds of the abrasive evenly over the surface and float. After embedment, sprinkle the remaining one-third at right angles to the previous application. Apply more heavily in areas not sufficiently covered by the first application, and float again immediately. Complete

finishing as specified under Trowelled Finish.

- K. Finish 11: Exposed edges (EXCEPT – edges normally covered with earth): Provide chamfer or beveled edges per this Section.
- L. Finish 12: Top of walls, beams, and similar unformed surfaces: Strike smooth and float in accordance with Finish 4.

3.13 SLAB FINISHING

- A. Screeding: After concrete has been thoroughly consolidated, screed slabs to the desired elevation and contours by means of accurately placed edge forms and intermediate screed strips.
- B. Floated Finish
 - 1. Place, consolidate, strike off, and level concrete, but do not work it further until ready for floating. Begin floating when water sheen has disappeared and when the surface has stiffened sufficiently.
 - 2. During or after the first floating, check planeness of surface with a 10-foot straightedge applied at not less than two different angles, and then cut down all high spots and fill all low spots to achieve a true plane within 1/4-inch in 10 feet.
 - 3. Refloat slab immediately to a uniform sandy texture.
- C. Troweled Finish: Float finish slab as described above, then steel trowel by machine or by hand. Additional trowellings shall be done by hand after the surface has hardened sufficiently. Final trowelling shall produce a ringing sound from the trowel and the finished surface shall be free of trowel marks, uniform in texture, and appearance shall be planed to the tolerance specified under Floated Finish. Trowelled finish shall occur at tank floors (except where grout topping or fillets will follow), troughs, channels, clear wells, and all building floor slabs.
- D. Coarse Broom Finish: Immediately after floating, give slabs for exterior walkways and exterior stoops a coarse transverse scored texture by drawing a broom across the surface.

3.14 FLOOR HARDENER

- A. All building floors not scheduled for floor covering, Non-slip Floor Finish, or Broom finish shall receive hardener (Finish 7).
- B. Apply hardener after floors have cured, in accordance with the manufacturer's recommendations.
- C. Floors shall receive three applications of hardener, mixed and applied as specified for heavy duty floors.

3.15 CURING AND PROTECTION

- A. General: Beginning immediately after placement, protect concrete from drying, excessively hot and cold temperatures and mechanical injury. Keep moisture loss to a minimum until cement has hydrated and concrete is hard. Keep concrete constantly moist during the curing period. Follow color admixture manufacturer's recommendations for integrally colored concrete.
- B. Curing
 - 1. Formed Surfaces: Keep forms wet. Cool metal forms exposed to the sun with water. Forms shall remain in place for 7 days unless material specified for in Section 2.21 Curing Materials is applied. If curing compound is used, apply in accordance with manufacturer's instructions. Curing compound shall not be used on any wall/slab scheduled to be coated.
 - 2. Slabs: Immediately after finishing, apply one of the materials specified in Section 2.21 entitled Curing Materials, but use membrane forming liquid only with Engineer's approval.
 - 3. Duration of Curing: 7 days minimum.
- C. Protection
 - 1. In cold weather, maintain the moisture conditions but also, by heating or covering, maintain the temperature of the concrete between 50 degrees F and 70 degrees F for entire curing period.
 - 2. In hot weather take immediate steps to protect newly finished concrete from drying effects of wind and sun, and maintain temperature of the air surrounding the concrete uniform within 5 degrees F in any one hour or 50 degrees F in any 24 hour period.
 - 3. During curing period, protect concrete from mechanical damage, loading, shock and vibration.

3.16 CONSTRUCTION OF CONCRETE FILLETS, TOPPING, AND EQUIPMENT PADS

- A. Concrete fillets, topping and equipment pads shall be placed as soon as possible after completion of the curing period of the tank walls and structural floors. Contact surfaces shall be thoroughly cleaned to the degree recommended by the bonding agent manufacturer.
- B. Bonding agent shall be accurately and thoroughly mixed and applied at the manufacturer's recommended coverage rate. Mix only the amount which can be used prior to expiration of the pot life. Concrete shall be immediately placed over the fresh surface before setting of the agent. Bonding agent which sets up prior to placing concrete shall be recoated with a fresh coat.
- C. Concrete fillets, topping, and equipment pads shall be accurately screeded to the slopes and elevations shown and steel trowel finished. Cure concrete as specified for slabs above. Set

equipment anchor bolts in pad to accommodate equipment furnished.

3.17 BACKFILL AGAINST STRUCTURES

- A. Backfill against concrete structures shall not be allowed until the concrete has reached the specified 28-day compressive strength. Where backfill is to be place on both sides of the wall, or against more than one wall of a structure, place the backfill uniformly on both sides of the wall or walls.

Do not backfill until structure has passed leakage testing.

- B. Do not backfill the walls of structures that are laterally restrained or supported by suspended slabs or slabs on grade until the slab is poured and the concrete has reached the specified compressive strength.

3.18 NONSHRINK GROUT

Use nonshrink grout to fill sleeves and voids under equipment bases. Grout shall be mixed and used in accordance with manufacturer's recommendations. Exposed edges shall be smooth, straight and even.

3.19 ADHESIVE ANCHORS

Install in strict conformance to manufacturer's printed instructions. Do not cut or damage existing reinforcing bars. Where reinforcing bars are encountered, move anchor location or core hole as approved by the Engineer.

3.20 LEAKAGE TESTING OF HYDRAULIC STRUCTURES

A. General

1. Prior to backfilling the structure and the application of water-proofing coatings, hydrostatically test reinforced concrete structures which will contain water or fluid to determine that they conform to Section B herein and are free of detectable leaks. Do not start leak testing or cleaning of surfaces until concrete is cured and joint sealants have set and cured a minimum of 14 days. Do not hydrostatically test walls which are to be restrained or laterally supported by slabs until slab concrete has obtained the specified compressive strength.
2. Prior to testing, clean exposed surfaces by thoroughly hosing and removing surface laitance and loose matter from walls and slabs. Remove wash water and debris from the structures by means other than washing through plant piping.

B. Leakage Test Procedure

1. Fill hydraulic structures to be subjected to leakage tests with potable water to the normal operating liquid level line not less than 2 feet below top of walls. Filling shall be at a uniform rate over a 24-hour period with continuous monitoring. For structures with adjacent bays, fill all bays simultaneously. Empty adjacent bays

alternately. Repair any running leaks which appear during filling before continuing.

2. After the structure has been kept full for 48 hours, it will be assumed for the purposes of the test that the absorption of moisture by the concrete in the structure is complete. Then close all valves and gates to the structure and measure the change in water surface each day for a five-day period.
3. During the test period, examine exposed portions of the structure, and mark visible leaks or damp spots. A damp spot is defined as an area which seeps sufficient moisture to dampen a paper towel when pressed against it. Repair visible leaks or damp spots after dewatering. Additionally, if the drop in water surface in the 24-hour period exceeds 1/10 of 1% of the normal volume of liquid contained in the structure, the leakage shall be considered excessive.
4. The determination of surface moisture evaporation shall be aided with a 24-inch deep, white colored, watertight container with not less than 10 square feet of surface area exposure. Position container to experience environmental conditions similar to the structure being tested. Subtract the water loss due to evaporation from the measured water loss in the structure to determine the water loss due to leakage.
5. If the leakage is excessive, drain the structure, repair leaks and damp spots, and refill the structure and again test for leakage. Continue this process until the drop in water surface in a 24-hour period meets the test requirements.
6. If an underdrain system is present, inspect the manholes of the underdrain system for evidence of leaks in the floor slabs. If leaking is indicated, locate and repair.
7. Seed the floor slab of each hydraulic structure with one sack of cement per 1,000 square foot surface area. Seeding shall take place after the test filling has reached 18 inches in depth. Detect leaks in construction and expansion joints with the aid of a diver. Stir cementitious deposits flowing toward leaks and repair where the defect is located.
8. Repair flowing leaks whether leakage exceeds the allowable leakage or not.
9. Repairs and additional filling and testing shall be made by the Contractor at no additional cost to the Owner.

C. Repair of Defects

1. Do not repair defects until concrete has been reviewed by the Owner's Representative.
2. Surface Defects: Repair surface defects that are smaller than 1 foot across in any direction and are less than 1/2 inch in depth. Repair by removing the honeycombed and other defective concrete down to sound concrete, make the edges perpendicular to the surface and at least 3/8 inch deep, thoroughly dampen the

surface, work into the surface a bonding grout, fill the hole with mortar, match the finish on the adjacent concrete, and cure as specified.

3. Severe Defects: Repair severe defects that are larger than surface defects but do not appear to affect the structural integrity of the structure. Repair by removing the honeycombed and other defective concrete down to sound concrete, make the edges perpendicular to the surface, sandblast the surface, coat the sandblasted surface with epoxy bonding compound, place nonshrink grout as specified herein, match the finish on the adjacent concrete, and cure as specified.
4. Major Defects: If the defects are serious or affect the structural integrity of the structure or if patching does not satisfactorily restore the quality and appearance to the surface, the Engineer may require the concrete to be removed and replaced, complete, in accordance with the provisions of this section at no additional cost to the Owner.

D. Repair of Cracks in Concrete

1. Repair leaking concrete cracks that are 1/10 inch or less in width by epoxy pressure injection.
 - a. Preparation: Insert and anchor a one-way polyethylene valve or pipe nipple in holes drilled into crack. Position them every 6- to 18-inches on center depending on the width of crack. Maintain a slow, steady pressure rather than a rapid buildup of pressure. When grouting material reaches the next tube, stop off the present position and follow the same procedure on the next position.
 - b. Upon completion of the epoxy grouting, remove the epoxy gel used to hold the valve or nipple by applying a direct flame to the epoxy and scraping it off. Fill the holes with the same material as used for patching the surface.
 - c. While the valves or nipples are installed first, the grouting operation shall not commence until after the patch work has been completed and has sufficiently cured.
2. Repair cracks in concrete structures that are wider than 1/10 inch in width by cutting out a square edged and uniformly aligned joint 3/8 inch wide by 3/4 inch deep, preparing exposed surfaces of the joint, priming the joint, and applying polyurethane joint sealant in accordance with this section.
3. If the cracks are serious or affect the structural integrity or function of the element, the Engineer may require the concrete to be removed and replaced, complete, in accordance with the provisions of this section at no additional cost to the Owner.
4. After repairing visible leaks, damp spots or leaking concrete cracks, retest the structure.

3.21 CONCRETE TESTING

A CERTIFIED testing laboratory, at Owner's expense shall perform the following concrete testing:

- A. One set of four concrete test cylinders shall be taken for every 50 cubic yards or fraction thereof of each concrete mix design placed each day. The Engineer has the option to direct the required test specimens to be taken as he deems necessary to insure the concrete meets the specification.
- B. Specimens shall be taken, cured, and tested for compressive strength in accordance with ASTM C31, ASTM C39, and ASTM C172, respectively.
- C. Test one cylinder at 7 days for information; test two cylinders at 28 days for acceptance; and hold one cylinder for verification. Strength acceptance will be based on the average of the strengths of the two cylinders tested at 28 days. If one cylinder of a 28-day test manifests evidence of improper sampling, molding, or testing, other than low strength, discard it and use the fourth cylinder for the test result.
- D. Determine the concrete slump by ASTM C143 with each strength test sampling and as required to establish consistency.
- E. Determine air content of the concrete using ASTM C231 to verify the percentage of air in the concrete immediately prior to depositing in the forms.
- F. Test reports shall be sent to the Engineer with copies to the Contractor.
- G. The average value of concrete strength tests shall be equal to or greater than the specified 28-day strength. No test shall be less than 90% of the specified 28-day strength.
- H. If the 28-day strength tests fail to meet the specified minimum compressive strength, the concrete will be assumed to be defective and one set of three cores from each area may be taken as selected by the Owner and in accordance with ASTM C42. If the average compressive strength of the set of three concrete cores fails to equal 90% of the specified minimum compressive strength or if any single core is less than 75% of the minimum specified compressive strength, the concrete will be considered defective. The Owner may require additional coring, nondestructive load testing, or repair of defective concrete. Costs of coring, testing of cores, load testing, and required repairing pertaining thereto shall be paid by the Contractor at no extra cost to the Owner.

3.22 DAMAGED OR DEFECTIVE CONCRETE

Remove damaged or defective concrete before completion and acceptance of the work and replace with acceptable concrete, at no additional cost to the Owner.

END OF SECTION

SECTION 03110

CONTROLLED LOW STRENGTH MATERIAL

PART 1 GENERAL

1.1 SUMMARY

Section Includes: Controlled Low Strength Material (CLSM).

1.2 RELATED SECTIONS:

- A. Section 02225 – Structure Excavation and Backfill
- B. Section 03100 - Concrete

1.3 REFERENCES

American Society of Testing and Materials (ASTM):

- A. C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
- B. C33 - Standard Specification for Concrete Aggregates.
- C. C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
- D. C143 - Standard Test Method for Slump of Hydraulic Cement Concrete.
- E. C231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
- F. C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
- G. C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.
- H. D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³(2,700 kN-m/m³))

1.4 SYSTEM DESCRIPTION

Performance Requirements:

- A. Total Calculated Air Content: Not be less than 8.0 percent nor greater than 12.0 percent.
- B. Minimum Unconfined Compressive Strength: Not less than 50 pounds per square inch measured at 28 days.
- C. Maximum Unconfined Compressive Strength: Not greater than 150 pounds per square inch measured at 28 days.
- D. Wet Density: No greater than 132 pounds per cubic foot.

1.5 SUBMITTALS

- A. Product Data: Submit data completely describing products.
- B. Sieve Analysis: Submit sieve analyses of fine and coarse aggregates being used in triplicate. Resubmit at any time there is a significant change in grading of materials.
- C. Mix: Submit full details, including mix design calculations for mix proposed for use.
- D. Trial Batch Test Data:
 - 1. Submit data for each test cylinder.
 - 2. Submit data that identifies mix and slump for each test cylinder.
- E. Cement Mill Tests: Include alkali content, representative of each shipment of cement for verification of compliance with specified requirements.
- F. Pozzolan Certificate of Compliance: Identify source of pozzolan and certify compliance with requirements of ASTM C 618.

PART 2 MATERIALS

2.1 MATERIALS

- A. Portland Cement: Type II modified portland cement as specified in Section 03100.
- B. Fly Ash: As specified in Section 03100.

- C. Water: As specified in Section 03100.
- D. Admixture: Air entraining admixture in accordance with ASTM C260.
- E. Fine Aggregate: Concrete sand that does not need to be in accordance with ASTM C33. No more than 12 percent of fine aggregate shall pass a No. 200 sieve, and no plastic fines shall be present.
- F. Coarse Aggregate: Pea gravel no larger than 3/8 inch.

2.2 MIXES

Suggested Design Mix

Material	Weight	Specific Gravity	Absolute Volume Cubic Foot
Cement	30 pounds	3.15	0.15
Fly Ash	300 pounds	2.30	2.09
Water	283 pounds	1.00	4.54
Coarse Aggregate	1,465 pounds	2.68	8.76
Fine Aggregate	1,465 pounds	2.68	8.76
Admixture	4-6 ounces		2.70
TOTAL	3,543 pounds		27.00

2.3 SOURCE QUALITY CONTROL

- A. Trial Batch:
 - 1. After mix design has been accepted by Engineer, have trial batch of the accepted mix design prepared by testing laboratory acceptable to Engineer.
 - 2. Prepare trial batches using specified cementitious materials and aggregates proposed to be used for the Work.
 - 3. Prepare trial batch with sufficient quantity to determine slump, workability, consistency, and to provide sufficient test cylinders.
- B. Test Cylinders:
 - 1. Prepare test cylinders in accordance with ASTM C31 with the following exceptions:
 - a. Fill the concrete test cylinders to overflowing and tap sides lightly to settle the mix.

- b. Do not rod the concrete mix.
 - c. Strike off the excess material.
- 2. Place test cylinders in a moist curing room. Exercise caution in moving and transporting the cylinders since they are fragile and will withstand only minimal bumping, banging, or jolting without damage. Do not remove the test cylinder from mold until the cylinder is to be capped and tested.
- 3. Do not remove the test cylinder from mold until the cylinder is to be capped and tested.
- 4. The test cylinders may be capped with standard sulfur compound or neoprene pads:
 - a. Perform the capping carefully to prevent premature fractures.
 - b. Use neoprene pads a minimum of 1/2 inch thick, and 1/2 inch larger in diameter than the test cylinders.
 - c. Do not perform initial compression test until the cylinders reach a minimum age of 3 days.
- C. Compression Test 8 Test Cylinders: Test 4 test cylinders at 3 days and 4 at 28 days in accordance with ASTM C39 except as modified herein:
 - 1. The compression strength of the 4 test cylinders tested at 28 days shall be equal to or greater than the minimum required compression strength, but shall not exceed maximum compression strength.
- D. If the trial batch tests do not meet the Specifications for strength or density, revise and resubmit the mix design, and prepare additional trial batch and tests. Repeat until an acceptable trial batch is produced that meets the Specifications.
 - 1. All the trial batches and acceptability of materials shall be paid by the Contractor.
 - 2. After acceptance, do not change the mix design without submitting a new mix design, trial batches, and test information.
- E. Determine Slump in Accordance with ASTM C143 with the Following Exceptions:
 - 1. Do not rod the concrete material.
 - 2. Place material in slump cone in one semi-continuous filling operation, slightly overfill, tap lightly, strike off, and then measure and record slump.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Prior to placement, soils located below controlled low strength material placement shall be prepared per Specification 02225.
- B. Place controlled low strength material by any method which preserves the quality of the material in terms of compressive strength and density:
 - 1. Limit lift heights of CLSM placed against structures and other facilities that could be damaged due to the pressure from the CLSM, to the lesser of 3 feet or the lift height indicated on the Drawings. Do not place another lift of CLSM until the last lift of CLSM has set and gained sufficient strength to prevent lateral load due to the weight of the next lift of CLSM.
 - 2. The basic requirement for placement equipment and placement methods is the maintenance of its fluid properties.
 - 3. Transport and place material so that it flows easily around, beneath, or through walls, pipes, conduits, or other structures.
 - 4. Use a slump of the placed material greater than 9 inches, and sufficient to allow the material to flow freely during placement:
 - a. After trial batch testing and acceptance, maintain slump developed during testing during construction at all times within plus or minus 1 inch.
 - 5. Use a slump, consistency, workability, flow characteristics, and pumpability (where required) such that when placed, the material is self-compacting, self-densifying, and has sufficient plasticity that compaction or mechanical vibration is not required.

3.2 FIELD QUALITY CONTROL

- A. General:
 - 1. Make provisions for and furnish all material for the test specimens, and provide manual assistance to assist the Engineer in preparing said specimens.
 - 2. Be responsible for the care of and providing curing condition for the test specimens.
- B. Tests by Owner:
 - 1. During the progress of construction, the Owner will have tests made to determine whether the controlled low strength material, as being produced, complies with the requirements specified hereinbefore. Test cylinders will be made and delivered to the laboratory by the Engineer and the testing expense will be borne by the Owner.

2. Test Cylinders:

- a. Prepare test cylinders in accordance with ASTM C31 with the following exceptions:
 - 1) Fill the concrete test cylinders to overflowing and tap sides lightly to settle the mix.
 - 2) Do not rod the concrete mix.
 - 3) Strike off the excess material.
 - b. Place the cylinders in a safe location away from the construction activities. Keep the cylinders moist by covering with wet burlap, or equivalent. Do not sprinkle water directly on the cylinders.
 - c. After 2 days, place the cylinders in a protective container for transport to the laboratory for testing. The concrete test cylinders are fragile and shall be handled carefully. The container may be a box with a Styrofoam or similar lining that will limit the jarring and bumping of the cylinders.
 - d. Place test cylinders in a moist curing room. Exercise caution in moving and transporting the cylinders since they are fragile and will withstand only minimal bumping, banging, or jolting without damage.
 - e. Do not remove the test cylinder from mold until the cylinder is to be capped and tested.
 - f. The test cylinders may be capped with standard sulfur compound or neoprene pads:
 - 1) Perform the capping carefully to prevent premature fractures.
 - 2) Use neoprene pads a minimum of 1/2 inch thick, and 1/2 inch larger in diameter than the test cylinders.
 - 3) Do not perform initial compression test until the cylinders reach a minimum age of 3 days.
3. Not less than 3 cylinder specimens will be tested for each 150 cubic yards of controlled low strength material and not less than 3 specimens for each half day's placement:
- a. Test 1 cylinder at 3 days and 2 at 28 days in accordance with ASTM C39 except as modified herein.
 - b. The compression strength of the cylinders tested at 28 days shall be equal to or greater than the minimum required compression strength, but shall not exceed maximum compression strength.
4. The Owner will test the air content of the controlled low strength material. Test will be made immediately after discharge from the mixer in accordance with ASTM C231.

C. Tests by Contractor:

1. Test the slump of controlled low strength material using a slump cone in accordance with ASTM C143 with the following exceptions:
 - a. Do not rod the concrete material.
 - b. Place material in slump cone in one semi-continuous filling operation, slightly overfill, tap lightly, strike off, and then measure and record slump.
2. Test the slump at the beginning of each placement, as often as necessary to keep the slump within the specified range, and when requested to do so by the Engineer

END OF SECTION

SECTION 03480

PRECAST UTILITY VAULTS AND CATCH BASINS

PART 1: GENERAL

1.01 DESCRIPTION

The work of this section consists of furnishing and installing precast concrete utility vaults with covers for flow meters, process equipment and other shown services, and also catch basins, all as shown on the drawings or specified herein.

1.02 SUBMITTALS

- A. In accordance with Section 01300, submit manufacturer's literature and drawings showing complete layout, dimensions, design loadings, materials of construction, etc.
- B. For all precast items which are manufactured, the Contractor shall also submit a list of the design criteria used by the manufacturer.
- C. The Contractor shall submit approved ICBO reports for all lifting inserts, showing allowable design loads on the inserts.
- D. Verification of compressive strength shall be submitted in accordance with Section 01300. Such verification may be laboratory trial batch test results with a minimum of three test cylinders or a series of production compression tests with a minimum of 20 sets of test data which fall within the evaluation and acceptance criteria specified herein. Such tests must have been made within the previous two years on the identical concrete mix submitted.
- E. For vaults larger than 4'-0" in any dimension, drawings and calculations shall be signed by a Civil or Structural Engineer registered in California.

1.03 QUALITY ASSURANCE

Test methods and criteria for evaluation and acceptance of concrete shall be as specified in Section 03100, "Concrete".

PART 2: MATERIALS

2.01 VAULT AND CATCH BASIN DESIGN AND MANUFACTURE

- A. Design Loads: Design loads shall consist of live load, dead load, impact load, hydrostatic load, and other loads that may occur. Live loads shall be for H-20 and/or H-20-S16-44, or as required, per AASHTO Standard Specifications for Highway Bridges with revisions. Design wheel loads shall be sixteen (16) kips.

Earth loads shall include a 2-foot soil surcharge.

- B. Forms: All forms used in placing concrete shall be sufficiently designed and braced to

maintain alignment under pressures of concrete placement.

C. Concrete

1. Aggregates used in the concrete mix either coarse or fine, excluding light-weight aggregates, shall conform to specifications as outlined by ASTM C33.
2. All light-weight aggregates, fine or coarse, shall conform to specifications as outlined by ASTM C330.
3. Both types of aggregates shall be properly graded and free of any deleterious substances so as to produce a homogeneous concrete mix when blended with cement.

D. Cement: The cement shall be Type II low alkali Portland cement and shall meet ASTM C150 Type II standards.

E. Compressive Strength: Sufficient cement content shall be used per batch so as to produce a minimum strength of 4,000 psi at 28 days or other strength by design when required.

F. Batching: A central batching facility shall be used to assure accurate weighing and mixing of materials to obtain a suitable concrete mix.

G. Placing: Concrete shall be made by properly proportioned parts of sand, aggregate and cement with sufficient water to produce a concrete mix of uniform quality and slump. Handling from the mixer or the transport vehicle to the forms for deposit will be in a continuous manner, as rapidly as practicable without segregation or loss of ingredients, until the unit or segment pouring is completed. Compaction by either external or internal mechanical vibration shall be used during the placement of the concrete mix.

H. Curing: Concrete while still in the forms may be steam cured after an initial set has taken place. Steam temperature shall not exceed 160°F, nor raised from normal ambient temperature at a rate exceeding 40°F per hour. Steam curing shall be considered complete after sufficient time has elapsed to produce adequate strength to withstand any structural strain that may be subjected during the form stripping operation. Additional curing may be applied by means of water spraying or membrane curing compound to reach the ultimate strength requirements.

I. Reinforcing Steel: All reinforcing steel, including welded wire mesh, shall be of the size and in the location required for design loads. All reinforcing shall be sufficiently tied to withstand any displacement during the pouring operation. All bars shall be intermediate grade, or as specified, billet steel conforming to ASTM A615.

J. Preformed Joint Sealant: The joint sealing compound shall be Quik-Seal, a preformed, cold applied, ready to use plastic joint sealing compound as supplied by Quikset Utility Vaults, Santa Ana, California; Ram-Neck by K.T. Syder Company; or approved equal.

2.02 UTILITY VAULTS

- A. Dimensions as shown on the drawings, minimum size shall be 24" x 30". Open bottom or enclosed with drain or without, as shown or required for service intended.
- B. Vault Cover: Designed for H-20 traffic loading. Galvanized Steel, bolt down, drag off, unless shown to be hinged with spring assist, on the drawings or specified.
- C. Hinged Spring Assist Vault Cover: Where shown on the drawings, vaults shall be provided with spring or torsion assisted two-piece galvanized steel or aluminum covers. Covers shall be designed for H-20 traffic loading and equipped with heavy forged brass hinges with stainless steel pins, and automatic hold open arm with release handle, and compression spring operators for ease of operation and to act as a check in retarding downward motion covers. Hardware shall be zinc plated and chromate sealed. Factory finish shall be a "Mill finish with bituminous coating applied to exterior of the frame". Cover shall be Bilco Model JD-H-20, Halliday Products Series 2HW, or approved equal.
- D. Manufacturers: Brooks Products, Inc., Stockton, CA; Jensen Precast, Sparks, NV; Utility Vault Co.; or equal.

2.03 CATCH BASINS

- A. Unless otherwise noted, catch basins shall be 3' x 3' x 6" wall thickness with bottom. Catch basins shall have progressive webbed knock-outs to provide maximum flexibility, permitting pipe of any size to be neatly and quickly grouted at the job site. All reinforcing steel shall meet ASTM specifications.
- B. Catch Basin Grating: Cast iron or galvanized steel, H-20 traffic loading.
- C. Manufacturers: Christy Concrete Products, Inc.; Jensen; or equal.

PART 3: EXECUTION

3.01 INSTALLATION

Vaults shall be installed as shown on the Drawings and as recommended by the Manufacturer. Catch basins shall be placed on 6-inch compacted class 2 aggregate base. Vaults deeper than 10 feet below grade shall be placed on 12-inches of crushed rock wrapped in geotextile fabric. Vaults less than 10 feet below grade shall be placed on 12-inches of compacted class 2 aggregate base. Install level with top at grade in roadways and two to three inches above grade outside of roadways.

3.02 PRECAST VAULT

The above-mentioned precast item shall be installed in accordance with the manufacturer's recommendations, unless otherwise required by the drawings. All joints shall be sealed by the use of preformed sealant and mortar or non-shrink grout so as to be water tight. Interior joints shall be tooled flush.

3.03 CONNECTIONS

Connections to manufactured, precast items shall be made by casting sections of pipe into the items,

using non-shrink grout as shown on the drawings, and/or using an approved resilient connector. All such connections shall be water tight.

END OF SECTION

SECTION 03600

GROUT

PART 1 – GENERAL

1.01 DESCRIPTION

This Section specifies grout for uses other than masonry. Masonry grout is specified in Section 04200 – Unit Masonry.

1.02 QUALITY ASSURANCE

A. Quality Control by Contractor: To demonstrate conformance with the specified requirements for grout, provide the services of an independent testing laboratory which complies with the requirements of ASTM E329. The testing laboratory shall sample and test grout materials as required in this section. Costs of testing laboratory services shall be borne by the Contractor.

1.03 SUBMITTALS

A. Comply with Section 01300 – Submittals.

B. Manufacturer's Data: Manufacturer's data shall be provided for the following:

1. Bonding compounds.
2. Nonshrink grout.
3. Pressure grout.
4. Retardants.
5. Epoxy grout.
6. Polymer concrete.

C. Laboratory Test Reports: Test reports on previously tested materials shall be accompanied by the manufacturer's statement that the previously tested material is the same type, quality, manufacture, and make as that proposed for use in this project. Test reports are required for the following:

1. Cement.
2. Aggregates.

3. Retardants.
4. Bonding compounds.
5. Epoxy resin.

D. Evidence of Testing Laboratory Competence: The laboratory will provide results directly to the Engineer. Evidence shall be provided of the most recent inspection of its facilities by the Cement and Concrete Reference Laboratory of the National Bureau of Standards. The evidences shall show that deficiencies mentioned in the report of that inspection have been corrected. The evidence of inspection shall be provided prior to delivery of materials to the job site.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Cement: Portland Cement shall be ASTM C150, Type II or Type V, low alkali, containing less than 0.60 percent alkalies.
- B. Aggregate
 1. General: Aggregate shall be nonreactive and shall be washed before use. When sources of aggregate are changed, test reports shall be provided for the new material. The tests specified shall be performed prior to commencing grout work.
 2. Fine Aggregate: Fine aggregate shall be hard, dense, durable particles of either sand or crushed stone regularly graded from coarse to fine and shall conform to ASTM C33 as modified herein. When tested in accordance with ASTM C136, gradation shall be such that 100 percent by weight will pass a standard No. 8 mesh sieve and no less than 45 percent by weight will pass a standard No. 40 mesh sieve.

Variation from the specified gradations in individual tests will be acceptable if the average of three consecutive tests is within the specified limits and the variation is within the permissible variation listed below:

U.S. Standard	Permissible Variation In
<u>Sieve Size</u>	<u>Individual Tests, Percent</u>
30 or coarser	2.0
50 or finer	0.5

Other tests shall be in accordance with the following specifications:

Test	Test method	Requirements
Organic Impurities	ASTM C40	Color lighter than standard
Amount of Material Passing No. 200 Sieve	ASTM C117	3% maximum by weight
Soundness	ASTM C88	10% maximum loss with sodium sulfate
Reactivity	ASTM C289	Innocuous aggregate
Sand Equivalent	ASTM D2419	Minimum 80

C. Admixtures

1. General: Admixtures shall be compatible with the grout. Calcium chloride or admixtures containing calcium chloride are not acceptable. Admixtures shall be used in accordance with the manufacturer's recommendations and shall be added separately to the grout mix.
 2. Water Reducing Retarder: Water reducing retarder shall be ASTM C494 Type D and shall be Master Builders Pozzoloth 300-R, Sika Corporation Plastiment, or equal.
 3. Lubricant for Cement Pressure Grouting: Lubricant additive for cement pressure grouting shall be Intrusion Prepakt Intrusion Aid, Sika Intraplast N, or equal.
- D. Water: Water for washing aggregate, for mixing and for curing shall be free from oil and deleterious amounts of acids, alkalies, and organic materials; shall not contain more than 1000 mg/l of chlorides as Cl, nor more than 1300 mg/l of sulfates as SO₄; and shall not contain an amount of impurities that may cause a change of more than 25 percent in the setting time of the cement nor a reduction of more than five percent in the compressive strength of the grout at 14 days when compared with the result obtained with distilled water. Additionally, water used for curing shall not contain an amount of impurities sufficient to discolor the grout.

2.02 GROUT

- A. Drypack Grout: Drypack grout shall be a mixture of approximately one part cement, one and one-half to two parts sand, water reducing retarder, and sufficient water to make a stiff workable mix.
- B. Cement Grout: Cement grout shall be a mixture of one part cement, two parts sand, proportioned by volume, admixtures for pressure grouting, and sufficient water to form a workable mix.
- C. Nonshrink Grout: Nonshrink grout is available with both metallic and nonmetallic aggregate. Metallic aggregate grout shall be Master Builders Embeco 636, The Burke Company Metallic Spec Grout, Sonnoborn Ferrolith G Redimix, or equal. Nonmetallic

aggregate grout shall be Five Star Products, Inc. Five Star Grout, Master Builders Masterflow 713, The Burke Company Non-Ferrous, Non-Shrink Grout, or equal.

- D. Epoxy Grout for Crack Repair and Dowel Anchorage: Except as noted below, epoxy grout shall be a high modulus, two-component, moisture-insensitive, 100-percent solids, thermosetting modified polyamid epoxy compound. The consistency shall be a paste form capable of not sagging in horizontal or overhead anchoring configurations. Material shall conform to ASTM C881, Type 1, Grade 3, such as Adhesive Engineering Concrecrete 1440 series, Sika Corporation Sikadur Hi-Mod Series, Adhesive Technology Corporation Solidbond 200, or equal, and shall have a heat deflection temperature in excess of 130°F.

Epoxy for pressure grouting/crack injection shall be a two-component, moisture-insensitive, high modulus, injection grade, 100 percent solids, blend of epoxy-resin compounds. The consistency shall be as required to achieve complete penetration in hairline cracks and larger. Material shall conform to ASTM C881, Type 1, Grade 1, such as Sika Corporation Sikadur 52, Adhesive Engineering Company SCB products, Adhesive Technology Corporation SLV 300 series, or equal.

- E. Polymer Concrete (for Resurfacing or Patching): Polymer concrete (for resurfacing or patching) shall consist of a liquid binder and dry aggregate mixed together to make a mortar or grout of a consistency as required for the application. The liquid binder shall be a chemical and oil resistant, stress relieved, low modulus, moisture insensitive, two-component epoxy-resin compound. The consistency shall be similar to lightweight oil for proper mixing with aggregate. Material shall conform to ASTM C881, Type 3, Grade 1, such as Sika Corporation Sikadur Lo-Mod series, Adhesive Engineering Concrecrete 1470, Adhesive Technology Corporation 400 series, or equal.

The aggregate shall be oven dry in sealed packages until time of mixing, and shall be of size and consistency compatible with recommendations of manufacturer of liquid binder for intended application.

- F. Adhesive Capsules for Dowel Anchorage: Adhesive resin capsules shall consist of sealed glass capsules containing premeasured amounts of a polyester or vinylester resin, quartz sand aggregate and a hardener contained in a separate vial within the capsule. Adhesive capsules shall be Hilti HEA Capsules, Molly Parabond Capsules, or equal.

2.03 PRESSURE GROUTING EQUIPMENT

Pressure grouting equipment shall include a mixer and holdover agitator tanks and shall be designed to place grout at pressures up to 50 psi. Gages shall be provided to indicate pressure used. The mixer shall be provided with a meter capable of indicating to one-tenth of a cubic foot the volume of grout used.

- A. Manufacturer's Data: Manufacturer's data shall be provided for the following:

1. Bonding compounds.

2. Nonshrink grout.
 3. Pressure grout.
 4. Retardants.
 5. Epoxy grout.
 6. Polymer concrete.
- B. Laboratory Test Reports: Test reports on previously tested materials shall be accompanied by the manufacturer's statement that the previously tested material is the same type, quality, manufacture, and make as that proposed for use in this project. Test reports are required for the following:
1. Cement.
 2. Aggregates.
 3. Retardants.
 4. Bonding compounds.
 5. Epoxy resin.
- C. Evidence of Testing Laboratory Competence: The laboratory will provide results directly to the Engineer. Evidence shall be provided of the most recent inspection of its facilities by the Cement and Concrete Reference Laboratory of the National Bureau of Standards. The evidences shall show that deficiencies mentioned in the report of that inspection have been corrected. The evidence of inspection shall be provided prior to delivery of materials to the job site

PART 3 – EXECUTION

3.01 GENERAL

Bonding compound for use with grout is specified in Section 03300 – Cast-In-Place Concrete. Primer, if required for polymer concrete, shall be provided per manufacturer's recommendation.

3.02 DRYPACK GROUT

Drypack grout shall be used for built-up surfaces, setting miscellaneous metal items and minor repairs.

Surfaces required to be built up with drypack grout shall be roughened by brushing, cleaned, and coated with the bonding compound specified in paragraph 03300-2.05 before the application of the grout. The drypack grout shall be applied immediately following the application of the bonding compound in bands or strips to form a covering of the required thickness. The covering shall be

smooth. Construction joints in the grout shall be sloped and shall be cleaned and wetted before application is resumed.

Drypack grout shall be cured in accordance with Section 03300 – Cast-In-Place Concrete.

Grout shall not be placed during freezing weather unless adequate protection is provided.

3.03 CEMENT GROUT

Cement grout shall be used for filling nonbearing portions of equipment pads and pressure grouting.

Except for the specialized equipment for pressure grouting, mixing and placing apparatus shall be similar to that normally used for cast-in-place concrete. Grout shall be mixed for a period of at least one minute. Diluted grout shall be agitated to keep ingredients mixed.

3.04 NONSHRINK GROUT

Nonshrink, nonmetallic aggregate grout shall be used for the bearing surfaces of machinery and equipment bases, column base plates and bearing plates. Nonshrink metallic aggregate grout shall be used for setting anchor bolts and grouting reinforcing steel holes. Grout shall meet the requirements of CRD-C621 and shall be placed in accordance with manufacturer's instructions.

Holes required for grouting shall be blown clean with compressed air and left free of dust or standing water. Horizontal holes for grouting shall be drilled at a slight downward angle to facilitate holding the grout until setting is complete. Bolts or reinforcing steel installed in horizontal grout holes shall be bent slightly accordingly.

3.05 EPOXY GROUT

Epoxy grout shall be used for repairing cracks by pressure grouting or gravity flow, repairing structural concrete, and may be used for setting reinforcing dowels or anchor bolts into holes for grouting. Concrete shall be primed in accordance with the grout manufacturer's instructions.

Use of epoxy grout for anchorage of bolts or reinforcing dowels shall be subject to the following conditions:

- A. Use shall be limited to locations where exposure, on an intermittent or continuous basis, to acid concentrations higher than 10 percent, to chlorine gas, or to machine or diesel oils, is extremely unlikely.
- B. Use shall be limited to applications where exposure to fire or exposure to concrete or rod temperature above the product's heat deflection temperature or 120 degrees F (whichever is less) is extremely unlikely. Overhead applications (such as pipe supports) because of the above concerns, shall be disallowed.

- C. Approval from Engineer for specific application and from supplier of equipment to be anchored, if applicable.
- D. Anchor diameter and grade of steel shall be per contract documents or per equipment supplier specifications. Anchor shall be threaded or deformed full length of embedment and shall be free of rust, scale, grease, and oils.
- E. Embedment depth and hole diameter shall be as specified.
- F. Holes shall have rough surfaces, such as can be achieved using a rotary percussion drill.
- G. Holes shall be blown clean with compressed air and be free of dust or standing water prior to application of grout.
- H. Anchor shall be left undisturbed and unloaded for full curing period.
- I. Anchors shall not be placed in concrete below 25°F.

3.06 ADHESIVE CAPSULES

Adhesive resin capsules may be used for setting and anchoring reinforcing dowels or anchor bolts into predrilled holes in concrete.

3.07 PRESSURE GROUTING

Prior to grouting, systems and holes to be grouted shall be washed clean. Washing is not required for grouting soil voids outside pipe cylinders or casing pipes. Grouting, once commenced, shall be completed without stoppage. In case of breakdown of equipment, wash out the grouting system sufficiently to ensure fresh grout and adequate bond and penetration will occur upon restarting the grouting operation. Grout pressure shall be maintained until grout has set.

END OF SECTION

SECTION 10400

IDENTIFYING DEVICES

PART 1: GENERAL

1.01 DESCRIPTION

The work of this section consists of providing safety signs, identifying devices for buildings, structures, piping, valves, and underground warning tapes for buried utilities.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01300: Submittals
- B. Section 15010: General Process and Onsite Utility Piping Provisions

1.03 SUBMITTALS

- A. In accordance with Section 01300.
- B. Samples of sign materials, colors and exterior letters, along with manufacturer's literature and shop drawings.
- C. Submit a complete schedule of all signs, including sign label, type, location and support.

PART 2: MATERIALS

2.01 SIGNS - GENERAL

- A. Colors, legends, and layout shall conform to OSHA 1910.145 requirements.
- B. Overall size of signs 10 inches X 14 inches.
- C. Material:

1/8-inch thick rigid Butyrate (BSR) or fiberglass with printed message and background sealed within a fiberglass resin, suitable for outdoor weather conditions. Seton Name Plate Corporation, New Haven, CT 06505; W.H. Brady Company, Milwaukee, WI 53201, or equal.

2.02 "DANGER" SIGNS (NOT SURED)

Two-inch high white letters "Danger" in red oval surrounded by a rectangular black field. Text wording 1½-inch high black capital letters on white field.

No. of Signs Required	Text Wording	Location
2	"HIGH VOLTAGE"	As directed by the Engineer
2	"EQUIPMENT STARTS AUTOMATICALLY"	As directed by the Engineer
2	"NO TRESPASSING"	As directed by the Engineer

2.03 IDENTIFICATION OF PIPING AND VALVES

- A. Piping: Plastic markers for coding pipe shall conform to ANSI A13.1 and shall be as manufactured by W.H. Brady Company, Seton Name Plate Corporation, or equal. Markers shall be the mechanically attached type that are easily removable; they shall not be the adhesive applied type. Markers shall consist of pressure sensitive legends applied to plastic backing which is strapped or otherwise mechanically attached to the pipe.

Plastic zip ties shall not be allowed for fastening.

Legend and backing shall be resistant to petroleum based oils and grease shall meet criteria for humidity, solar radiation, rain, salt, and fog and leakage fungus, as specified by MIL-STD-810 C. Markers shall withstand a continuous operating temperature range of -40°F to +180°F. Plastic coding markers shall not be the individual letter type but shall be manufactured and applied in one continuous length of plastic.

Markers shall be provided in the following letter heights:

Outside Pipe Diameter (inches*)	Letter Height (inches)
Less than 1-½	½
1-½ through 3	1- ⅛
Greater than 3	2-¼

* Outside pipe diameter shall include insulation and jacketing.

In addition, pipe markers shall include uni- and bi-directional arrows in the same

sizes as the legend.

Colors of identification and letters shall comply with the legend below and with ANSI A13.1. See Section 15010 for color code usage.

Pipe Identification Color	Background Color	Color of Lettering/Arrows
1	Yellow	Black
2	Green	White
3	Blue	White
4	Purple	White

- B. Valves: Valve tags shall be 2½ inches by 2½ inches, custom engraved (one side) plastic for interior labels and anodized aluminum for exterior. Provide three lines engraving, up to eight characters per line. Background colors shall be red, blue, yellow, or green, as specified. Wording and colors to be specified at a later date.

Valve tags shall be as manufactured by Seton Nameplate Corporation, New Haven, Connecticut; Emed Company, Buffalo, NY; or equal.

2.04 UNDERGROUND WARNING TAPE

- A. Tape shall be 2 inches wide, detectable type, polyethylene or polyester top and bottom, with metallic core completely sealed inside. Tape shall be color coded as specified below and shall be printed with a two-line message. Top line shall read "CAUTION CAUTION...", bottom line shall read as indicated below, or equivalent:

TYPE SERVICE	COLOR	BOTTOM LINE OF MESSAGE
GAS	YELLOW	"BURIED GAS LINE"
ELECTRIC	RED	"BURIED ELECTRIC LINE"
TELEPHONE	ORANGE	"BURIED TELEPHONE LINE"
WATER	BLUE	"BURIED WATER LINE"
SEWER	GREEN	"BURIED SEWER LINE"

ALL OTHER
PIPELINES

YELLOW

“BURIED PIPELINE”

- B. Underground warning tape shall be as manufactured by Seton Name Plate Corporation, New Haven, CT; W.H. Brady Company, Milwaukee, WI; or equal.

PART 3: EXECUTION

3.01 MOUNTING SAFETY AND CHEMICAL SIGNS (NOT USED)

- A. Install the signs at the locations designated by the Engineer.
- B. Mount signs with top of the sign 5'-6" above the floor.
- C. Secure with No. 10 stainless steel screws, providing expansion shields for concrete.
- D. Plastic ties shall not be used for fastening.
- E. Mounting holes in signs shall be oversized to allow signs to “float” free.

3.02 IDENTIFYING DEVICES FOR PIPING AND VALVES

- A. Piping: Identify all piping at approximately 10-foot centers and in general, at each valve and piece of equipment, but not less than once in each room whether or not concealed.
- B. Install valve tags on all process and main utility valves. Tags are not required on hose bibs, faucets, and similar applications. Attach tags to handwheel or stem using stainless steel cable; submit for approval.

3.03 UNDERGROUND WARNING TAPE

A single line of tape as specified in this section shall be provided above the centerline of all buried pipe and conduit. Unless shown otherwise on the drawings, tape shall be installed 6 inches below finished grade. Tape shall be laid flat with message side up before backfilling.

END OF SECTION

SECTION 15010

GENERAL PROCESS AND ONSITE UTILITY PIPING PROVISIONS

PART 1: GENERAL

1.01 SCOPE

This section contains general provisions applicable to all process and onsite utility piping. Specific requirements for each type of pipe to be used are provided in other sections of Division 15. Where specific requirements for a particular type of pipe are different than those in this section, the specific requirements shall govern.

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 01300: Submittals
- C. Section 01667: Testing of Pipelines
- D. Section 02223: Trenching, Backfilling, and Compacting
- E. Section 10400: Identifying Devices
- F. Section 15080: Piping Accessories and Appurtenances
- G. Section 15094: Hangers and Supports
- H. Section 15097: Seismic Restraint for Piping
- I. Section 15100: Valves

1.03 DRAWINGS

Drawings are diagrammatic and show the general design, arrangement and extent of the systems. Do not scale drawings for roughing in measurements, nor use as shop drawings. Make field measurements and prepare shop drawings as required. Coordinate work with shop drawings of other specification divisions.

1.04 SUBMITTALS: IN ACCORDANCE WITH SECTION 01300.

- A. Submittals shall be provided for the following items plus any additional items required in the specifications for the particular types of pipe:
 - 1. Piping and jointing materials
 - 2. Fittings
 - 3. Specialties
 - 4. Fabrication drawings of all major runs of pipe and all pipe which cannot be fabricated in the field.

5. The arrangement of piping and appurtenances proposed to serve equipment of other than the first named manufacturer.
- B. Contractor shall investigate the space requirements of the proposed piping before submitting shop drawings.

PART 2: MATERIALS

2.01 GENERAL

Pipe sizes are minimum nominal inside diameter unless otherwise noted. All sizes of pipe shall be as called out on the drawings and specified herein. All pipe and fittings delivered to the job site shall be clearly marked to identify the material, class, thickness, and manufacturer. All material shall be new and free of blemishes.

2.02 PIPING MATERIALS

- A. The Piping Materials Schedule lists the pipe materials that can be selected at the Contractor's option for each service, except where the drawings call for a specific pipe material. For any service not listed in the schedule, the pipe material shall be as allowed for a similar or connecting service of the same size.
- B. The Piping Materials Legend lists the pipe types and specification sections for the piping referred to by symbols in the Piping Materials Schedule.

PIPING MATERIALS SCHEDULE

Service	Material		Pipe ID Code (a)	Test Pressure PSI (b)
	Underground or Encased	Exposed		
Culvert	A, B	A, B	2	10
Drain	A, K			
Sewer (Gravity) (e)	V, A	A	3	10
Raw Sewage (Pumped) (d, e)	A	A	2	100
Vent	J	J	2	10

- (a) See Section 10400.
- (b) See Section 01667.
- (c) Piping schedule lists all piping materials used unless otherwise shown on the drawings.
- (d) All Pumped Piping system shall be restrained.
- (e) Special lining- Ductile Iron pipe and fittings shall be lined with 'Protecto 401' or approved equal.

PIPING MATERIALS LEGEND

Symbol	Description	Specification Section
A	Ductile Iron	15062
B	Corrugated Metal Pipe	---
C	Copper	15031
F	Schedule 40 Steel, Galvanized	15051
J	Schedule 80 PVC	15071
K	DR 18 C900 PVC	15071
Q	304L Stainless Steel Pipe Schedule 10s	15052
V	PVC Sewer Pipe, SDR 26	15071

2.03 POLYETHYLENE ENCASEMENT

All buried metallic piping, valves, specials, and fittings shall be polyethylene encased, double wrapped – 8 mils thickness, sized to pipe diameter, ANSI/AWWA-C105/A21.5.

PART 3: EXECUTION

3.01 HAULING, UNLOADING AND DISTRIBUTING PIPE

- A. During loading, transportation and unloading, every precaution shall be taken to prevent injury to the pipe, coating, and lining. No pipe shall be dropped from cars or trucks, or allowed to roll down slides without proper retaining ropes. Each pipe shall rest on suitable pads, strips, skids or blocks securely wedged or tied in place. Padding shall be used on car or truck stakes, skids, etc., to prevent damage to the pipe during transportation and handling. Any pipe damaged shall be replaced or repaired as approved by the Engineer at no additional cost to the Owner.

- B. Each section of pipe shall be delivered in the field as near as practicable to the place where it is to be installed. Pipes shall be distributed along the side of trench opposite to the spoil bank within easy reach of the installing crew.

Where it is necessary to move the pipe longitudinally along the trench, it shall be done in such a manner as not to injure the pipe. Pipe shall not be rolled or dragged on the ground. Where pipe is placed on stockpiles, it shall be neatly piled and blocked with strips between tiers.

3.02 INSTALLATION OF PIPELINES AND FITTINGS

- A. Trenching and Backfill:

1. Except as otherwise noted on the plans or specified herein, all excavation and backfilling for piping shall be as specified in Section 02223, "Trenching, Backfilling, and Compacting".
2. Pipelines located in or under fill areas shall not be placed until the fill has been constructed and compacted to an elevation at least one (1) foot above the elevation of the top of the pipe.
3. All backfill other than where concrete encasement is required, for pipelines installed under structures, slabs, footings, and paving shall be made with sand and fine gravel, thoroughly compacted in place to not less than 95% of maximum density.

B. Grades and Elevations:

1. All piping and appurtenances shall be installed in the position and to accurate lines, elevations, and grades as shown on the plans or specified herein. Where possible, piping shall be sloped to permit complete drainage. All pipelines shall be rigidly supported and braced by approved hangers, brackets, or other devices. When temporary supports are used, they shall be sufficiently rigid to prevent any shifting or distortion of the piping or related work.
2. Furnish all fittings necessary for the satisfactory alignment and arrangement of piping and all necessary unions and cleanouts.
3. An invert grade rod shall be used in laying all lines below ground.

C. Flexible Couplings:

1. Flexible couplings shall be installed where shown on the drawings and at such other points as may be required for ease of installation or removal of the pipe, subject to approval of the Engineer. Where necessary to prevent separation of pipe due to internal pressures, flexible couplings shall be of the type with set screws in the retainer gland or shall be provided with tie rods as approved by the Engineer. Where permanent flexibility is required, however, such as at connections to pumps or other equipment, and elsewhere as called for on the drawings, tie rods shall be the only acceptable restraining devices and shall be installed through separate mounting plates or lugs and not through flange bolt holes, in order to retain flexibility.
2. Where rubber or similar flexible couplings are called for on the Drawings, tie rods shall be provided if recommended by the manufacturer to prevent excessive elongation.

D. Flexible Joints: For pipelines extending from a concrete structure into earth, at least two flexible joints shall be provided in the earth within 3 feet of the structure face, one of which may be cast in structure with end flush with structure face. Piping beyond structure shall adequately supported by proper compaction under pipe or by supporting on firm undisturbed soil if necessary.

E. Union and Flanges:

1. In erecting the pipe, a sufficient number of screwed unions or flanged joints shall be used to allow any sections or runs of pipe to be disconnected without taking down adjacent runs. Screwed unions shall be used on pipelines two and one-half (2-1/2) inches in diameter and smaller. Flanged joints shall be employed in pipelines three (3) inches in diameter and larger.
 2. All exposed piping shall be provided with rigid joints as necessary to prevent shifting or separation due to internal pressures, seismic forces, or the weight of the pipe and its contents. Rigid joints shall include flanges, grooved couplings, screwed joints, welded joints, soldered joints, etc., unless otherwise noted on the drawings.
- F. Concrete Thrust Blocks: Unless noted otherwise, concrete thrust blocks shall not be allowed except at specific locations shown on the drawings. Thrust blocks shall be poured between the pipe or fitting and undisturbed earth.
1. In the absence of concrete thrust blocks, all pressure piping (for ductile iron, HDPE, and PVC) joints shall be restrained.
- G. Concrete Wall and Slab Penetrations:
1. Hydraulic Conditions - Piping passing through concrete walls normally below liquid level shall be installed with one of the following:
 - a. Cut-off collar cast on ductile iron fittings or pipe, 1/4-inch thick, 3-inches wide.
 - b. Cut-off collar welded to steel fittings or pipe, 1/4-inch thick, 3-inches wide.
 - d. Cored, canned, or sleeved hole of suitable size to be sealed with a modular mechanical interlocking EPDM synthetic rubber links shaped to continuously fill the annular space between pipe and opening, equal to "Link-Seal" by Thunderline Corp., Wayne, MI, along with grout as shown on the detail Drawings.
 2. Non-Hydraulic Conditions -
 - a. Piping passing through concrete walls, slabs, or footings from earth to earth shall have provision for reasonable relative movement by wrapping pipe with one-inch fiberglass entire thickness of concrete.
 - b. Horizontal or vertical piping passing through concrete walls, sidewalks, slabs, or footings from earth to air shall be wrapped with 3/8-inch thick, 60 durometer, rubber sheeting, secured with banding.
 - c. Cored, canned, or sleeved hole 3 inches to 7 inches larger diameter than the pipe; pack with non-shrink grout.
- H. Connections to Equipment:
1. The pipework of all pumps and equipment shall be adequately supported throughout and the weight thereof shall be carried independently of the pump casings or the equipment. All pipework shall be mounted parallel with vertical and horizontal axes of reference. All sections of pipe shall be rigidly bolted or joined together after being cut accurately to length in such a manner as to relieve any and all parts of equipment of undue strain resulting from closure of flanged or other joints or connections.

2. Equipment shall be so positioned and aligned that no strain shall be induced within the equipment during or subsequent to the installation of pipework.

I. Pipe Joints:

1. Pipe shall be cleaned of dirt and scale prior to installation and all joints swabbed clean before jointing. Ends of all pipe shall be closed or plugged at the end of each day's work or otherwise as necessary to prevent the entrance of foreign materials.
2. The Contractor shall perform all work of cutting pipe and special castings necessary to the assembly, erection and completion of the work. All pipe shall be cut and reamed to fit accurately with smooth edges.

J. Coatings for Buried Valves and Piping Accessories: All buried valves, flange assemblies, flexible connections, flange coupling adapters and similar fittings shall be coated with petrolatum wax tape. All buried nuts, bolts, washers, tie rods, and other threaded fasteners shall be Xylan/flouropolymer coated "Blue Bolts" or Type 316 stainless steel.

K. Coatings for submerged valves and piping accessories: All submerged items shall be coated as per Section 9900. All submerged nuts, bolts, washers, tie-rods, and other threaded fasteners shall be Type 316 stainless steel.

3.03 IDENTIFICATION: SEE SECTION 10400.

3.04 TESTING: SEE SECTION 01667.

3.05 CLEANING AND FLUSHING

- A. All pipelines shall be cleaned of all soil, dirt, rocks, and other debris and objectionable material.
- B. Pipelines 24-inches in diameter and smaller shall be cleaned first by pulling a tightly fitting cleaning ball or swab through the pipe. Pipelines larger than 24-inches in diameter may be cleaned manually or with a cleaning ball or swab.
- C. After initial cleaning, flush the interior of all piping. Upon completion of flushing, completely drain systems at all low points; remove, clean, and replace all strainer baskets and refill systems.

END OF SECTION

SECTION 15062

DUCTILE IRON PIPE (DIP)

PART 1: GENERAL

1.01 DESCRIPTION

The work of this section consists of furnishing and installing ductile iron pipe and fittings.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01300: Submittals
- B. Section 02221: Utility Trenching and Backfilling
- C. Section 02223: Trenching, Backfilling and Compaction
- D. Section 15010: General Process and Onsite Utility Piping Provisions
- E. Section 15080: Piping Accessories & Appurtenances
- F. Section 15094: Hangers and Supports
- G. Section 15097: Seismic Restraints for Piping
- H. Section 15100: Valves

1.03 QUALITY ASSURANCE

References, American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM), Federal Specifications (FS), and the manufacturer's printed recommendations.

1.04 SUBMITTALS

- A. In accordance with Section 01300.
- B. Materials list and catalog data sheets naming each product to be used identified by manufacturer and type number.

1.05 PRODUCT HANDLING

Handle pipe and fittings in a manner to insure delivery in a sound undamaged condition.

PART 2: MATERIALS

2.01 DUCTILE IRON PIPE

- A. Pipe shall conform to ANSI A21.50 (AWWA C115), ANSI A21.51 (AWWA C151), and A21.4 (AWWA C104) as appropriate.
- B. Flanged pipe shall be per ANSI A21.15 (AWWA C115) pressure class:

4 – 12-inches	Class 350
> 12-inches	Class 250
- C. Pipe wall thickness for grooved couplings shall be Class 54.
- D. Pipe wall thickness for push-on joint and mechanical joint pipe shall be Pressure Class 350 psi for pipe 12-inches and smaller, and Pressure Class 250 psi for larger pipe.
- E. Pipe shall have PROTECTO 401 lining and one mil bituminous coating per ANSI A21.4.

2.02 FITTINGS AND SPECIALS (EXCEPT GROOVED)

- A. Cast iron and ductile iron specials and fittings shall conform to ANSI A21.10 (AWWA C110) or ANSI 21.53 (AWWA C153) with joints as shown on the Drawings or as required elsewhere in these Specifications or for the installation. Fittings shall have an asphaltic outside coating in accordance with ANSI/AWWA C153/A21.53, except as otherwise noted herein.
- B. Interior lining of specials and fittings shall match the adjoining specified pipe lining, except as otherwise noted herein. All standard fittings shall be PROTECTO 401 lined and seal coated with bituminous material in accordance with ANSI/AWWA C104/A21.4, except as noted in Section C.
- C. Fusion epoxy line and coat all buried ductile or cast iron specials and fittings used in conjunction with PVC piping. Fusion epoxy shall be applied in accordance with 2.12.

2.03 FLANGES

- A. ANSI B16.1, CLASS 125 unless otherwise indicated, or required for the installation.
- B. Flanges for spool pieces shall be factory installed threaded flanges. Flanges for fittings shall be cast integrally with the fitting.

2.04 RESTRAINED MECHANICAL JOINTS

Where specified, called for on the Drawings, or otherwise required for thrust restraint, mechanical joints shall be made using retainer glands with set screws or clamping lugs. Retainer glands shall be as manufactured by EBAA Iron; Tyler Pipe, or equal.

2.05 RESTRAINED PUSH-ON JOINTS

Where specified, called for on the drawings, or otherwise required for thrust restraint, push-on joints shall be Flex-Ring as manufacturer by American Ductile Iron Pipe, TR Flex as manufactured by US Pipe, or equal. Restrained joint shall provide for joint deflection after assembly.

2.06 RUBBER GASKET FOR MECHANICAL OR PUSH-ON JOINT

ANSI A21.11 (AWWA C111), vulcanized natural or vulcanized synthetic rubber.

2.07 FLANGED GASKETS

Full face, 1/16-inch thick cloth inserted neoprene or metallic packing.

2.08 BOLTS & NUTS FOR FLANGES

ANSI B18.2.1 and B18.2.2, low alloy, high strength, zinc coated when exposed, and 316 stainless steel when buried or below top of wall in water bearing structures.

2.09 GROOVED FITTINGS

Cast iron, ASTM A-48, Class 30-A, cement lined. Victaulic, Gustin-Bacon, or equal.

2.10 POLYETHYLENE ENCASEMENT

Buried piping, specials, and fittings shall be polyethylene encased, double wrapped - 8 mils thickness, sized to pipe diameter, ANSI/AWWA-C105/A21.5.

2.11 PROTECTO 401

All ductile iron pipe, fittings and specials shall be Protecto 401 ceramic epoxy lined as specified herein:

- A. Protecto 401 shall be applied as indicated by the published specifications of the coating manufacturer.

2.12 FUSION EPOXY LINING AND COATING

Buried ductile iron fittings and specials shall be fusion epoxy lined and coated as specified herein:

- A. The fusion epoxy coating shall be 3M Scotchkote 206N (fluidized bed grade), or equal. Surface preparation shall be in accordance with SSPC-SP 10 Near White Blast Cleaning. The application method shall be by the fluidized bed method and shall attain 16 mils minimum dry film thickness.
- B. Field welds, connections and otherwise damaged areas shall be coated and patched according to the manufacturer's instructions with 3M Scotchkote 312.

PART 3: EXECUTION

3.01 INSTALLATION

- A. Bell and Spigot Ductile Iron Pipe. Where bell and spigot joints are used for joining ductile iron pipe, the joints shall be made using rubber rings, US "Tyton", Clow "Super Bell-Tite" joint, or equal. Gasket seat, gasket, and spigot shall be thoroughly cleaned before assembly of joint. The entire procedure shall be in strict accordance with manufacturer's recommendations.
- B. Mechanical Joint Ductile Iron Pipe. Mechanical joints in ductile iron pipe shall be made as follows: Gland shall be placed on spigot end of pipe with lip extension toward the joint. The rubber gasket shall then be slipped on the pipe with its thick edge toward the gland. The gasket and joint surfaces shall then be thoroughly wetted using a soapy solution made with vegetable soap or similar soap as recommended by the manufacturer. The spigot end of the pipe shall then be inserted to full depth of the mechanical joint socket and the gasket pressed firmly into place in the bell in order to obtain an even "set" all around the joint. The gland shall then be moved into place, the bolts inserted and the nuts taken up tightly with fingers. The nuts shall then be tightened gradually by wrench -- a half turn at a time, moving wrench from one nut to another repeating until all nuts are uniformly tight. Final tightness shall be with a torque wrench as follows: three-quarter inch bolts - 60 to 90 pounds torque.
- C. Flanged Pipe. Flanged joints shall be made up square, with even pressure on the gaskets, and shall be watertight.
- D. Grooved Coupling: Grooved couplings shall be prepared or painted as necessary to obtain a leak-free seal.
- E. Polyethylene Encasement for External Corrosion Protection for Buried Piping:
 - 1. General: Provide polyethylene encasement for all buried Ductile Iron Pipe.

2. Installation on Pipe:

- a. Pick up the pipe with a sling or pipe tongs. Slip a polyethylene tube which is approximately two feet longer than the pipe over the plain end and leave it bunched up accordion style.
- b. Lower the pipe into the trench and make up the joint with the preceding pipe. Shallow bell holes are required to allow overlap of the tube at the joints.
- c. Remove the sling or tong from the center of the pipe, raise the bell a few inches and slip the polyethylene tube along the pipe barrel, leaving approximately one foot of the tube bunched up at each end of the pipe for wrapping the joints.
- d. Overlap each joint by first pulling one bunched-up tube over the bell, folding it around the adjacent plain end, and securing it in place with two or three wraps of the polyethylene adhesive tape. Complete the overlap by repeating the same procedure with the bunched-up tube on the adjacent pipe.
- e. Take up the slack tube along the pipe barrel by folding it over the top of the pipe holding the fold in place with polyethylene adhesive tape.
- f. Repair any rips, punctures or other damage to the polyethylene with tape or by cutting open a short length of tube, wrapping it around the pipe and securing with tape.

3. Installation on Fittings, Valves and Piping Specialties:

- a. Fit bends, reducers and offsets with polyethylene tube in the same manner described above for pipe.
- b. Wrap valves, tees, crosses and specialty items with a flat sheet obtained by splitting open a length of polyethylene tube. Pass the sheet under the valve or fitting and bring it up around the body. Join the seams by bringing the edges together, folding over twice and securing in place with tape.
- c. Handle slack tube and overlapping at joints in the same manner described above for pipe.
- d. Prepare openings for service taps, air reliefs, etc., by making an X-shaped cut in the polyethylene and temporarily folding back the

edges. After installation is completed, replace the polyethylene and repair the cut with polyethylene adhesive tape.

4. Backfilling

- a. Care shall be taken not to damage the polyethylene.
- b. Initial backfill material shall be free of rocks and debris which could puncture the polyethylene. If suitable backfill material is not available, felt roofing or similar material can be laid over the top of the pipe to protect the polyethylene.
- c. In general, backfilling shall be done in accordance with AWWA Standard C-600.

END OF SECTION

SECTION 15071

PLASTIC PIPE

PART 1: GENERAL

1.01 DESCRIPTION

The work of this section consists of furnishing and installing polyvinyl chloride pipe and fittings.

1.02 PIPE DESIGNATIONS

The following plastic pipe and tubing designations are defined:

Designation	Definition
PVC	Polyvinyl chloride
CPVC	Chlorinated Polyvinyl Chloride

1.03 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01300: Submittals
- B. Section 02223: Trenching, Backfilling, and Compacting
- C. Section 15010: General Process and Onsite Utility Piping Provisions
- D. Section 15080: Piping Accessories and Appurtenances
- E. Section 15094: Hangers and Supports
- F. Section 15097: Seismic Restraints for Piping
- G. Section 15100: Valves

1.04 QUALITY ASSURANCE REFERENCES

This section contains references to some or all of the following documents, most recent edition. They are a part of this section as specified and modified. In case of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

Reference	Title
ASTM D3350	Specification for Polyethylene Plastics Pipe and Fittings Materials.
ASTM D1784	Rigid Polyvinyl Chloride (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
ASTM D1785	Polyvinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80, and 120
ASTM D2241	Polyvinyl Chloride (PVC) Pressure-Rated Pipe (SDR series)
ASTM D2464	Threaded Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 80
ASTM D2466	Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 40
ASTM D2467	Socket-Type Poly Vinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 80
ASTM D2564	Solvent Cements for Polyvinyl Chloride (PVC) Plastic Pipe and Fittings
ASTM D3034	Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings
ASTM D3050	Standard Specification for Polyethylene Plastics Pipe and Fittings Materials
ASTM D4101	Propylene Plastic Injection and Extrusion Materials
ASTM F402	Practice for Safe Handling of Solvent Cements and Primers Used for Joining Thermoplastic Pipe and Fittings

1.05 SUBMITTALS

- A. In accordance with Section 01300.
- B. Submit materials list and catalogue data sheets naming each product to be used identified by manufacturer and type number.

PART 2: MATERIALS

2.01 PVC PRESSURE PIPE

- A. General: PVC materials for pipe and fittings shall conform to ASTM D1784, Cell Classification 12454-B. In addition, additives shall be less than 10% by weight. Pipe and fitting materials shall be specially formulated with sufficient UV protection additives to provide for long-term outdoor exposure with no deleterious effects. Flanges shall be one-piece solid design or two-part van stone type which utilize the tapered, serrated face and full face gasket technique for joining and are compatible with ANSI N16.5 Class 150 metal flanges. Unions shall be the O-ring seal type having interchangeable components with true union valves for maximum system versatility.
- B. Schedule 40, 80, and 120: Pipe in accordance with ASTM D1785. Schedule 80 PVC socket type fittings shall conform to ASTM D2467. Schedule 40 PVC fittings shall conform to ASTM D2466. PVC solvent weld cement for socket connections shall meet the requirements of ASTM D2564. Schedule 80 PVC threaded fittings shall conform to ASTM D2464.

Solvent cement shall be as recommended by the manufacturer for each service. Cement for hydroxide and hypochlorite solutions shall be IPS 724 or equal.

- C. C900 (Class as indicated in Section 15010): Pipe shall meet the requirements of AWWA C900, "Polyvinyl Chloride (PVC) Pressure Pipe". All Class 100 pipe shall meet the requirements of DR 25, Class 150 pipe shall meet the requirements of DR 18 and Class 200 the requirements of DR 14. All pipe shall be suitable for use as pressure conduit. Provisions must be made for expansion and contraction at each joint with an elastomeric ring. The bell shall consist of an integral wall section with a locked-in, solid cross section elastomeric ring which meets the requirements of ASTM F477. The bell section shall be designed to be at least as hydrostatically strong as the pipe wall and meet the requirements of AWWA C900.
- D. C905 (Class as indicated in Section 15010): Pipe shall meet the requirements of AWWA C905, "Polyvinyl Chloride (PVC) Water Transmission Pipe" Class 165. In addition, additives shall be less than 10% by weight. Pipe shall meet the requirements of DR 25. All pipe shall be suitable for use as pressure conduit and shall be cast iron pipe o.d. Provisions must be made for expansion and contraction at each joint with an elastomeric ring. The bell shall consist of an integral wall section with a locked-in, solid cross section elastomeric ring which meets the requirements of ASTM F477. The bell section shall be designed to be at least as hydrostatically strong as the pipe wall.

Fittings shall be either ductile iron or PVC as follows:

1. Ductile Iron Fittings: As specified in Section 15062.

Fittings shall be double wrapped (8 mil) polyethylene encasement, sized to diameter, ANSI/AWWA – C1051/A21.5.

2. PVC Fittings: Shall match the pressure class of the pipe and be fabricated by a butt fusion or thermal form process approved by the Engineer. Fittings shall be overwrapped with fiberglass – reinforced polyester. Fittings shall be certified to CSA 137.3 standards. Fittings shall be manufactured by IPEX or pre-approved equal.

E. Restrained Joint PVC Pipe

1. Pipe shall be manufactured only from water distribution pipe and couplings conforming to AWWA C900. The restrained joint pipe system shall also meet all short and long term pressure test requirements of AWWA C900. Pipe, coupling, and locking splines shall be completely non-metallic to eliminate corrosion problems.

Nominal outside diameters and wall thicknesses of thrust-restrained pipe shall conform to the requirements of AWWA C900. Pipe shall be Class 150 furnished in standard lengths of 20 feet.

2. Pipe shall be joined using non-metallic couplings which, together, have been designed as an integral system for maximum reliability and interchangeability. High-strength flexible thermoplastic splines shall be inserted into mating precision-machined grooves in the pipe and coupling to provide full 360° restraint with evenly distributed loading. MJ Gland Adapters shall be used to anchor this restrained-joint PVC pipe to ductile iron accessories such as fittings and valves.
3. Pipe shall be white for potable water service (1W), purple for reclaimed water service (3W) and green for sewer/wastewater service.
4. Restrained joint PVC pipe and fittings shall be the CertainTeed Certa-Lok C900/RJ System, or approved equal.

2.02 PVC SEWER PIPE

- A. General: Pipe and fittings shall be made of PVC plastic having a cell classification of 12454-B as defined in ASTM D 1784 and shall have a SDR and minimum pipe stiffness as scheduled below. T-1 wall only is allowed. Additives and fillers including but not limited to stabilizers, antioxidants, lubricants, colorants, etc., shall not exceed 10 parts by weight per 100 of PVC resin in the compound.
- B. Pipe: PVC gravity sewer pipe and fittings shall conform to ASTM D 3034 for diameters from 4-inches to 15-inches, and ASTM F 679 for diameters from 18-inches to 30-inches, with integral-bell gasketed joints. Rubber gaskets shall be factory installed and conform to ASTM F 477. Pipe joints shall conform to ASTM

D 3212. Pipe shall be solid wall only, profile wall pipe is not allowed. Pipe thickness class shall be as follows:

1. For depths of cover 12 feet and less, SDR-35 pipe may be installed by the Contractor.
2. For depths of cover greater than 12 feet, SDR-26 pipe shall be installed by the Contractor.

C. Fittings: Pipe fittings shall be gasketed fittings matching the pipe SDR and conforming to ASTM D-2855 or ASTM F1336 as applicable. Fittings shall either be injection molded fittings as available or as specified for fiberglass wrapped C905 PVC fittings above. Fittings shall be as manufactured by IPEX or pre-approved equal.

2.03 CPVC PIPE

- A. CPVC material for pipe and fittings shall conform to ASTM D1784, Class 23447-B. Pipe and fittings shall be in accordance with ASTM F441. Neoprene gaskets with push-on joints shall conform to ASTM F477.
- B. Schedule 80 CPVC socket type fittings shall conform to ASTM F439. CPVC solvent weld cement for socket connections shall meet the requirements of ASTM F493. Schedule 80 CPVC threaded type fittings shall conform to ASTM F437.

2.04 SUBSURFACE DRAINS

Pipe and fittings shall be rigid, corrugated tubing manufactured of high-density polyethylene resins and conforming to ASTM Product Specifications F-405 and F-667. Drainage tubing shall be as manufactured by Advanced Drainage Systems (ADS), Inc., of Columbus, Ohio.

- i. Perforated Pipe: Perforations shall be linear slots cut radially into the tubing wall between corrugations. Perforated pipe shall be 6 inches. The screen will completely surround the pipe and will have a lapped, welded longitudinal joint.
- ii. Fittings: All couplings, reducers, tees, ells, plugs, caps, and other fittings shall be non-perforated and shall be of the same manufacturer as the drainage tubing. A fitting shall be used at each pipe junction/termination, as appropriate.

PART 3: EXECUTION

3.01 INSTALLATION OF PIPE AND FITTINGS

- A. General: In accordance with manufacturer's recommendations, ASTM 2321 and Section 15010, whichever is more stringent.

- B. Pipe and fittings shall be of the sizes indicated. Clean pipe interior of all foreign matter before installing. Pipe shall be square cut with fine tooth saw or other cutter or knife designed for use with plastic pipe. Remove burrs by smoothing edges with a knife, file, or sandpaper. Replace any section of pipe found to be defective or damaged with new acceptable pipe. Handle pipe carefully to prevent gouging or scratching. Any length of pipe having a gouge, scratch, or other permanent indentation more than 10 percent of the wall thickness in depth shall be rejected.

3.02 INSTALLATION OF SOLVENT WELD JOINT TYPE PIPE

In accordance with the recommendations of the pipe manufacturer and the following supplementary requirements:

- A. Do not solvent weld joints if it is raining, if atmospheric temperature is below 40 degrees F or above 90 degrees F, if the pipe is exposed to direct sunlight.
- B. Test fit dry pipe and fittings before applying cement. Pipe should enter socket without forcing at least one-third but not more than two-thirds the depth of socket. Fittings that are looser or tighter shall not be used. Thoroughly clean and dry the pipe end and socket of fitting with methyl ethyl ketone, acetone, or similar cleaner. Apply cement evenly to outside surface and end of pipe and inside surface of socket. Avoid excess application of cement but insure complete coverage of all bonding surfaces. Mark depth of socket on pipe to guide application of cement and insure full insertion of pipe. Insert pipe in socket, twisting pipe or fitting approximately $\frac{1}{2}$ turn as pipe is being seated in socket. Make sure pipe is fully seated providing a bond between end of pipe and shoulder of socket. Immediately wipe excess cement from pipe leaving no more than a 1/8-inch fillet at fitting end. Hold assembled joint in place for approximately 15 seconds and allow to set for 30 minutes before moving. Avoid rough handling for 48 hours. Longer periods may be required in cold or wet weather.

3.03 INSTALLATION OF PUSH-ON JOINT TYPE PIPE

Clean gaskets and seats of foreign materials prior to joint assembly. Apply lubricant as recommended by the pipe manufacturer. Carefully insert the spigot end into the bell to prevent entry of dirt and incorrect entry angle. With suitable fork tool, crowbar, or by hand, make the joint to the insertion depth recommended by the manufacturer. When the selected pipe uses joints not designed for full depth insertion, prevent further closure of previously completed joints by restraining movement of the installed line while making succeeding joints.

3.04 TESTING

- A. Pressure Testing: Shall be in accordance with Section 01667 and 15010.
- B. Field Inspection for Plastic Pipe and Fittings: Installed pipe shall be tested to ensure

that vertical deflections for plastic pipe do not exceed the maximum allowable deflection. All SDR 26 and 35 PVC Sewer Pipe shall be mandrel tested as outlined below. All C905 PVC pipe may be measured by the Engineer for over deflection above 3%. Maximum allowable deflections for SDR 26 and 35 pipe shall be governed by the mandrel requirements stated herein and shall nominally be the percentage listed of the maximum average ID.

Nominal Pipe Size	Percentage
Up to and including 12-inch	5.0
Over 12-inch to and including 30-inch	4.0
Over 30-inch	3.0

The maximum average ID shall be equal to the average OD per applicable ASTM Standard minus two minimum wall thicknesses per applicable ASTM Standards. Manufacturing and other tolerances shall not be considered for determining maximum allowable deflections.

Deflection tests shall be performed not sooner than 30 days after completion of placement and densification of backfill. The pipe shall be cleaned and inspected for offsets and obstructions prior to testing.

For all pipes less than 24-inch ID, a rigid mandrel shall be pulled through the pipe by hand to ensure that maximum allowable deflections have not been exceeded. Prior to use, the mandrel shall be certified by the Engineer. Use of an uncertified mandrel or mandrel altered or modified after certification will invalidate the test. If the mandrel fails to pass, the pipe will be deemed to be overdeflected.

Unless otherwise permitted by the Engineer any overdeflected pipe shall be uncovered and, if not damaged, reinstalled. Damaged pipe shall not be reinstalled, but shall be removed from the Work site. Any pipe subjected to any method or process other than removal, which attempts, even successfully, to reduce or cure any overdeflection, shall be uncovered, removed from the Work site and replaced with new pipe.

The mandrel shall:

1. Be rigid, non-adjustable, odd-numbering-leg (9 legs minimum) mandrel having an effective length not less than its nominal diameter.
2. Have a minimum diameter at any point along the full length as follows:

Pipe Material	Nominal Size (inches)	Minimum Mandrel Diameter * (inches)
PVC-ASTM D 3033 (SDR 35)	6	5.619
	8	7.309
	10	9.137
	12	10.963
	15	13.849
PVC-ASTM F 679 (T-1 Wall)	18	16.924
	21	19.952
	24	22.446
	27	25.297
	30	28.502
	36	35.03

* Mandrel diameters of SDR 26 pipe shall be based on 4% deflection of the average inside diameter.

3. Be fabricated of steel, be fitted with pulling rings at each end, be stamped or engraved on some segment other than a runner indicating the pipe material specification, nominal size and mandrel OD, (e.g., PVC D 3034-8"-7.524"; and be furnished in a suitable carrying case labeled with the same data as stamped or engraved on the mandrel.

For pipe IDs nominally 24-inch and larger, deflections shall be determined by a method submitted to and approved by the Engineer. If a mandrel is selected, the minimum diameter, length and other requirements shall conform to the dimensions and requirements as stated above.

All costs incurred by the Contractor attributable to mandrel and deflection testing, including any delays, shall be borne by the Contractor at no cost to the Owner.

END OF SECTION

SECTION 15080

PIPING ACCESSORIES AND APPURTENANCES

PART 1: GENERAL

1.01 DESCRIPTION

The work of this section consists of providing piping accessories and appurtenances.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Section 15010: General Process and Onsite Utility Piping Provisions

1.03 QUALITY ASSURANCE

Reference, American Society for Testing and Materials (ASTM).

1.04 SUBMITTALS

Materials list and catalog data sheets naming each product to be used identified by manufacturer and type number.

PART 2: MATERIALS

2.01 FLEXIBLE COUPLINGS

A. Application

	Baker	Smith-Blair	Dresser
Iron pipe size O.D. pipe	200	411,521	38,90
Ductile iron	228	411, 431, 441	38, 53, 138, 153
Transition	212, 236	413, 433	162
Reducing	220, 240	415, 435	62
Flanged coupling adapter	601, 602, 603, 604	912, 913, 914, 916	127, 128

Rockwell International, 400 North Lexington, Pittsburg, PA 15208; Dresser Mfg., 41 Fisher Ave., Bradford, PA 16701; R.H. Baker & Co., 2929 Santa Fe Ave., Los Angeles, CA 90058, or equal.

B. Materials

Cast couplings shall be used wherever possible. Steel couplings with a minimum sleeve thickness of the connecting pipe wall or 1/4-inch, whichever is greater, shall be used where cast couplings are not available.

1. Sleeve: Grey iron or steel.
2. Flanges: Malleable or ductile iron or high strength steel.
3. Bolts & Nuts: Low alloy, high strength, zinc coated when exposed, 316 stainless steel when buried or below top of wall in water bearing structures.
4. Finish of coupling: Fusion bonded epoxy coating.
5. Gaskets
 - a. General Purpose - Synthetic rubber (Rockwell grade 60, Dresser 42). Non-asbestos gasket for service above 180°F.
 - b. High Temperature Service – Gaskets on air piping (AE and AA service) shall be suitable for temperatures up to 300°F.

2.02 FLEXIBLE RUBBER COUPLINGS

- A. Type: Molded single arch spherical rubber expansion joints with full rubber flanges and retainer rings.
- B. Materials
 1. General Service (less than 225°F) - Neoprene with nylon reinforced body and galvanized steel retainer rings and fasteners.
 2. High Temperature Air Service (greater than 225°F) – EPDM with nylon reinforced body and galvanized steel retainer rings.
- C. Pressure Rating: 150 psi.
- D. Manufacturer: General Rubber Style 1015, or equal.

2.03 FLEXIBLE METAL HOSE CONNECTORS

- A. NPT Union or 150 pound flanged end connections.
- B. Type 321 stainless steel hose and braid.
- C. Minimum 200 steady working pressure at room temperature, safety factor of 4:1.
- D. Anaconda Metal Hose Type PCM or SPCF, 18518 Susana Rd., Compton, California 90221, Flexonics MMT or FLG, 300 East Devon Ave., Bartlett, IL 60103, or equal.

2.04 TENSION ASSEMBLIES

- A. Welded
 1. Assemblies per AWWA M11, Section 13.10

2. Rods shall be galvanized.
3. Buried assemblies shall receive two coats Bitumastic 50, Koppers, or equal.

B. Socket Clamps

1. Carbon steel half bands, bolts and nuts, galvanized.
2. Socket clamps, Grinnell Fig. 595, B-Line Systems Fig. B3134, or equal.
3. Socket clamp washers, Grinnell Fig. 594, B-Line Fig. B3134W, or equal.
4. Yoke, Grinnell Fig. 591.
5. Tee anchor strap, Grinnell Fig. 593, or equal.
6. Buried assemblies shall receive two coats Bitumastic 50, Koppers, or equal.
7. Grinnell Corporation, 155 Westminster Street, Providence, RI 02903; B-Line Systems, 509 West Monroe St., Highland, IL 62249, or equal.

2.05 MECHANICAL RUBBER SEAL

- A. Modular, mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill the annular space between the pipe and the wall opening.
- B. EPDM seal element suitable for service to 250°F.
- C. Composite pressure plates.
- D. 316 stainless steel nuts and bolts.
- E. Thunderline Link-Seal, or equal.

2.06 INSULATED (DIELECTRIC) FITTINGS

A. General

Provide complete insulation between sections of pipe in which installed. All buried pipelines of dissimilar metals shall be insulated from each other

B. Couplings and Bushings

1. Made of Delrin for sizes less than 2-inches, Calpico, Inc., 185 Harbor, South San Francisco, California 94080; Pacific Seal Industries, 3333 N. San Fernando Blvd., Burbank, California 91504, or equal.
2. Heavy duty couplings with insulating linings for 2-inch and larger, Rockwell 416 and 438, Dresser 39 or equal.

C. Flanges

1. Assembly consisting of gaskets, insulating bolt sleeves, and appurtenances.
2. Pacific Seal Industries; Calpico, Inc.; or equal.

2.07 PRESSURE GAUGES (PG)

- A. Liquid filled, glycerine or silicone.
- B. 2½- to 3½-inch dial, scale 20-50% greater than normal operating pressure, 270 degree movement.
- C. Stainless steel case and polycarbonate window
- D. Provide gauges with Type 316 stainless steel socket and bellows or bourdon tube, depending on pressure range.
 1. Where the maximum pressure is less than or equal to 15 pounds per square inch the gauge shall use bellows as the measuring element.
 2. Where the maximum pressure is greater than 15 pounds per square inch, the measuring element shall be a bourdon tube.
- E. 2½ percent accuracy.
- F. ¼-inch NPT bottom connection.
- G. Mount gauges on diaphragm seals where indicated on the Drawings.
 1. Provide diaphragm seals with Type 316 stainless steel top housing, bottom housing, and bolt assemblies.
 - a. Bottom housing shall be fitted with a ¼-inch flushing connection.
 - b. This flushing connection shall be fitted with a Type 316 stainless steel close nipple and a brass shutoff cock.
 - c. Diaphragm Seal: Removable.
 - 1) For pressure less than or equal to 15 pounds per square inch, provide a diaphragm seal.
 - 2) For pressures greater than 15 pounds per square inch, provide Type 316 stainless steel diaphragm seal.
 - d. Fit diaphragm seal gauge assembly with a snubber.
 - e. Snubber shall have porous metal disc sized to dampen pressure fluctuations in the filled system.

- f. Snubber shall be Stainless Steel.
- g. Snubber filter disc shall be sized to prevent the gauge from pulsating.
- h. Provide diaphragm seal gauge assemblies filled with silicon.
- 2. Pressure gauges, except gauges with diaphragm seals, shall have pulsation dampeners installed between the gauge and the shut-off valve.
- 3. Pulsation Dampeners shall be Stainless Steel.

H. Manufacturers

- 1. PRESSURE GAUGES: One of the following or equal.
 - a. U.S. Gauge Division of Ametek, Inc. Solfrunt Gauges, Figure Number 1931T.
 - b. Dresser Industries, Inc., Ashcroft Figure Number 1379.
- 2. DIAPHRAGM SEAL: One of the following or equal:
 - a. For pressure less than or equal to 15 pounds per square inch:
 - b. Ashcroft, Type 301.
 - c. Mansfield and Green, Type LG.
 - d. For pressures greater than 15 pounds per square inch:
 - e. Ashcroft, Type 101.
 - f. Mansfield and Green, Type RG.
- 3. Snubber: One of the following or equal:
Chemiquip, Ashcroft
- 4. Pulsation Dampeners: One of the following or equal:
 - a. Dresser Industries, Inc., Ashcroft Figure Number 1106S.
 - b. Operation and Maintenance Specialties, Charlotte, N. C., Ray Pressure Snubbers.
- 5. ¼-inch stainless steel cross handle cock, Ashcroft 7004; Marsh MFG, or equal

2.08 LINE SIZE PRESSURE SENSORS

- A. Full line size with flanged or threaded ends
- B. Carbon steel body with flexible neoprene tube and liquid cavity.
- C. Rated at 200 psi with 2 percent accuracy.
- D. Gauge and liquid as specified in subsection 2.11 above.
- E. Red Valve Series 30 or 40, 500 No. Bell Ave., Carnegie, PA 15106; Ronningen-Petter "Iso-Spool" or "Iso-Ring", Portage, MI 49081, or equal

2.09 PIPELINE STRAINERS

- A. 2-inches and smaller
 - 1. Y-pattern.
 - 2. Bronze or cast iron body.
 - 3. 316 Stainless steel or monel screen, .045-inch perforations, 4 to 1 straining ratio.
 - 4. Blowoff connection with bronze ball valve.
 - 5. Muessco Model 11 or 351; Leslie Co., or equal.
- B. Simplex Basket Style
 - 1. 8-inch flanged unless otherwise noted on the Drawings.
 - 2. Cast iron body.
 - 3. Stainless steel perforated screen, with a straining area at least 6 times the pipe cross sectional area, perforation size as noted on the Drawings.
 - 4. Quick open cover shall not require tools to remove the basket for cleaning.
 - 5. Machined basket seats, Buna N seals.
 - 6. Threaded drain, vent, and pressure taps as shown on the Drawings.
 - 7. Hayward Industrial Products, Model 72, or equal.

2.10 CURB STOPS

- A. Manufacturers: One of the following or equal.
 - 1. Ford
 - 2. Mueller Company

- B. Description: Round way solid tee head stops.

2.11 CORPORATION STOPS

- A. In accordance with AWWA C 800.
- B. Manufacturers: One of the following or equal.
 - 1. Ford
 - 2. Mueller Company

2.12 COCKS

- A. Gauge Cock:
Manufacturers: One of the following or equal.
 Lunkenheimer Company, Figure 1178 or Figure 1180
- B. Air Cock:
Manufacturers: One of the following or equal.
 - 1. Whitey Research Tool Company, Model B-42S4
 - 2. Hoke Inc., 7122G4B
- C. Plug Cock Manufacturers: One of the following or equal.
 Lunkenheimer Company, Figure 454
- D. Design:
Plug Cocks: Bronze, straightway pattern complete with lever

2.13 PIPE SADDLES

- A. Manufacturers: One of the following or equal.
 - 1. BTR Inc./Smith-Blair, Inc., Style 317
 - 2. Romac Industries, Inc., Style 202S
- B. Materials
 - 1. Pipe Saddles: Ductile iron.
 - 2. Straps, Bolts, and Nuts: Type 304 stainless steel with Teflon coating on nuts.

3. Gaskets: EPDM

2.14 Channel Grates

Grates should be securely locked down with built-in channel lock blocks. Locking mechanism shall be designed so as to provide an obstruction-free trench for maintenance and cleaning as well as to prevent concrete from entering channels during installation.

Channel grates shall be installed as scheduled below:

1. Non-corrosive traffic* areas – Ductile iron, slotted, H2O rated.
2. Non-corrosive, pedestrian traffic - slotted, galvanized steel.
3. Corrosive traffic* areas - vinyl ester, slotted, load Class C.
4. Corrosive pedestrian traffic – vinyl ester slotted.

*Traffic includes fork lift travel.

Areas normally wet shall be considered corrosive areas.

2.15 Catch Basins

Catch basins shall be precast polymer concrete with FRP grates. Any trench drains entering catch basins shall interlock fully with tongue and groove connections

A. Joint Sealers

To prevent leakage, joints between channels, catch basin connections, etc., shall be sealed with an adhesive recommended by the manufacturer.

B. Manufacturer's

Trench drains shall be as manufactured by ACO Polymer Products, Inc., Chagrin Falls, OH, Polydrain ABT, Inc., Troutman, N.C., or equal.

2.16 SIMPLEX BASKET STRAINERS

- A. 4-Inch flanged connections, cast iron construction, 150 psi rated.
- B. T-handle quick release cover.
- C. Basket Strainer: SST 1/32" perforated basket, Cv = 375.
- D. Manufacturer: Hayward model 72 or equal.

2.17 FLUSHING CONNECTION

- A. Cast bronze swivel inlet adapter, rocker lugs.

- B. 1-inch NPT inlet, hose thread outlet.
- C. DeSanno Foundry & Machine Co. No. 73, 1933 Peralta, Oakland, CA 94607; Champion No. 10, 1460 No. Naud St., Los Angeles, CA 90012, or equal.

2.18 TAPPING SLEEVES

- A. Manufacturers: One of the following or equal.
 - 1. BTR Inc./Smith-Blair, Inc., Style 622
 - 2. Romac Industries, Inc., Style FTS 420
- B. Materials:
 - 1. Tapping Sleeves: Steel construction.
 - 2. Bolts and Nuts: Type 304 stainless steel.
 - 3. Nuts: Teflon coated.
 - 4. Gaskets: EPDM
 - 5. Size of Tapped Boss: As indicated on the Drawings

PART 3: EXECUTION

3.01 INSTALLATION

Install in accordance with manufacturer's recommendations.

3.02 FLEXIBLE COUPLINGS

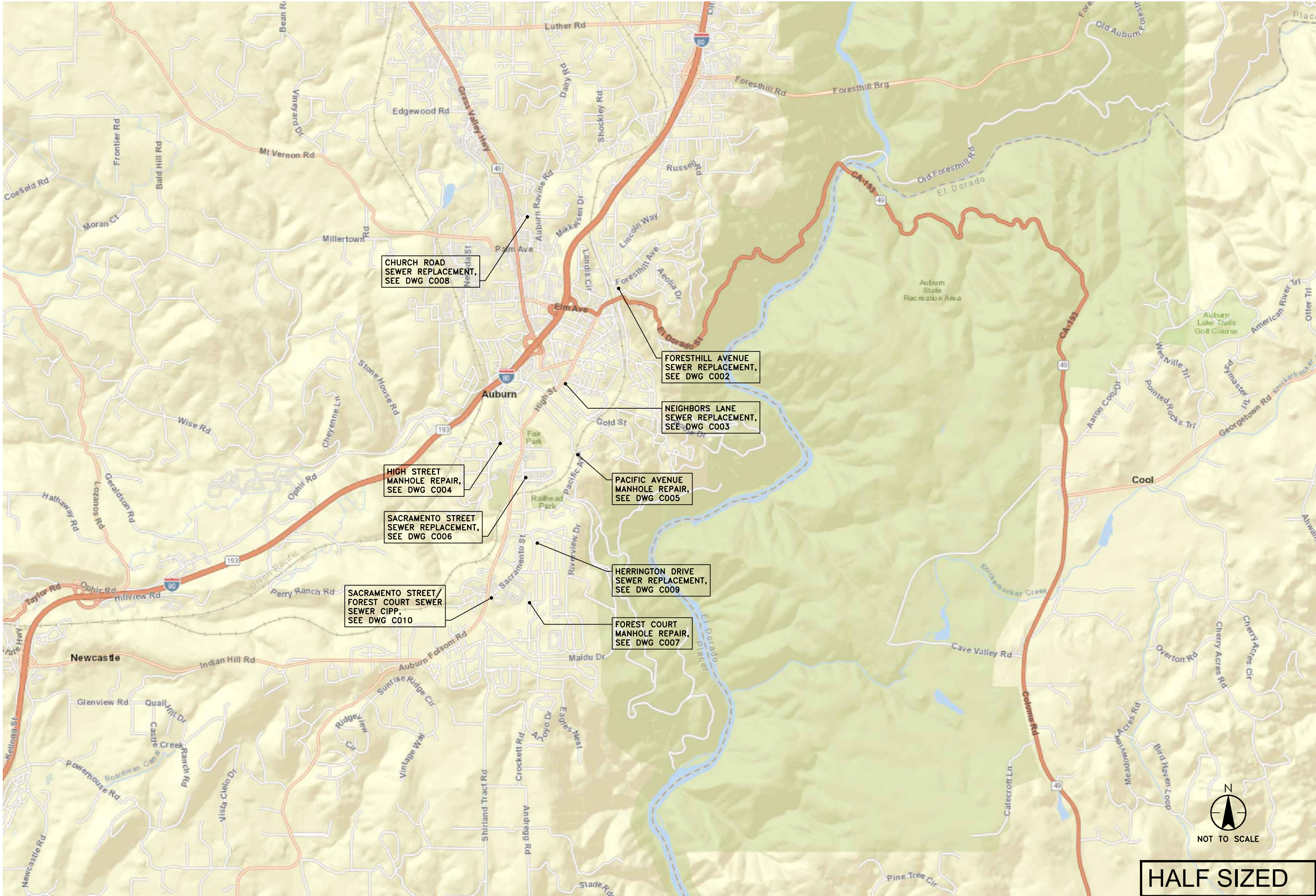
- A. Install where shown on Drawings and where required for ease of installation or removal of pipe, subject to approval of Engineer.
- B. Provide tension assemblies as specified in herein where necessary to prevent separation of pipe due to internal pressures.

END OF SECTION

SECTION G

2022 SEWER IMPROVEMENTS PROJECT IN THE CITY OF AUBURN, CALIFORNIA

CONTRACT DRAWINGS



BAR IS ONE INCH
AT FULL SCALE

APR'L	REVISIONS	DATE

NEXGEN UTILITY MANAGEMENT

4010 LENNANE DRIVE
SACRAMENTO, CA 95834
916.564.8000

NEXGEN

CITY OF AUBURN

AUBURN 2021 SEWER
IMPROVEMENTS PROJECT

PLACER COUNTY, CALIFORNIA

OVER ALL REPAIRS AND
REPLACEMENT LOCATIONS

DATE: 3/31/2022
SCALE: NTS
DRAWN BY: JA
DESIGNED BY: JR
CHECKED BY: DR

JOB NO: -

DRAWING NO:
C001

1 OF 13 SHEETS

NOT TO SCALE

HALF SIZED



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AT FULL SCALE

DATE	REVISIONS	APRVL
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NEXGEN UTILITY MANAGEMENT

4010 LENNANE DRIVE
SACRAMENTO, CA 95834
916.564.8000

NEXGEN

CITY OF AUBURN

AUBURN 2021 SEWER
IMPROVEMENTS PROJECT

PLACER COUNTY, CALIFORNIA

FORESTHILL AVENUE
SEWER REPLACEMENT

DATE: 3/31/2022
SCALE: 1"=20'
DRAWN BY: JA
DESIGNED BY: JR
CHECKED BY: DR

JOB NO: -

DRAWING NO:
C002

2 OF 13 SHEETS

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NEXGEN UTILITY MANAGEMENT

4010 LENNANE DRIVE
SACRAMENTO, CA 95834
916.561.8000

NEXGEN

CITY OF AUBURN

AUBURN 2021 SEWER
IMPROVEMENTS PROJECT

PLACER COUNTY, CALIFORNIA

NEIGHBORS LANE
SEWER REPLACEMENT

DATE: 3/31/2022
SCALE: 1"=20'
DRAWN BY: JA
DESIGNED BY: JR
CHECKED BY: DR

JOB NO: -

DRAWING NO:
C003

3 OF 13 SHEETS

0 10 20 40 60
1"=20'

N

HALF SIZED


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NEXGEN UTILITY MANAGEMENT
4010 LENNANE DRIVE
SACRAMENTO, CA 95834
916.564.8000

NEXGEN

CITY OF AUBURN
AUBURN 2021 SEWER
IMPROVEMENTS PROJECT
PLACER COUNTY, CALIFORNIA

HIGH STREET
MANHOLE SSMH-918 REPAIR

DATE: 3/31/2022
SCALE: 1"=20'
DRAWN BY: JA
DESIGNED BY: JR
CHECKED BY: DR

JOB NO: -
DRAWING NO:
C004

4 OF 13 SHEETS

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NEXGEN UTILITY MANAGEMENT

4010 LENNANE DRIVE
SACRAMENTO, CA 95834
916.564.8000

CITY OF AUBURN

AUBURN 2021 SEWER IMPROVEMENTS PROJECT

PLACER COUNTY, CALIFORNIA

PACIFIC AVENUE MANHOLE REPAIR

DATE: 3/31/2022

SCALE: 1"=20'

DRAWN BY: JA

DESIGNED BY: JR

CHECKED BY: DR

JOB NO: -

DRAWING NO: C005


5 OF 13 SHEETS



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AT FULL SCALE

APR'L	REVISIONS	DATE

NEXGEN UTILITY MANAGEMENT
4010 LENNANE DRIVE
SACRAMENTO, CA 95834
916.564.8000

NEXGEN

CITY OF AUBURN
AUBURN 2021 SEWER
IMPROVEMENTS PROJECT
PLACER COUNTY, CALIFORNIA

SACRAMENTO STREET
SEWER REPLACEMENT

DATE: 3/31/2022
SCALE: 1"=40'
DRAWN BY: JA
DESIGNED BY: JR
CHECKED BY: DR

JOB NO: -

DRAWING NO:
C006

6 OF 13 SHEETS


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NEXGEN UTILITY MANAGEMENT
4010 LENNANE DRIVE
SACRAMENTO, CA 95834
916.564.8000

NEXGEN

CITY OF AUBURN
AUBURN 2021 SEWER
IMPROVEMENTS PROJECT
PLACER COUNTY, CALIFORNIA

FOREST COURT MANHOLE
SSMH-1126 REPAIR

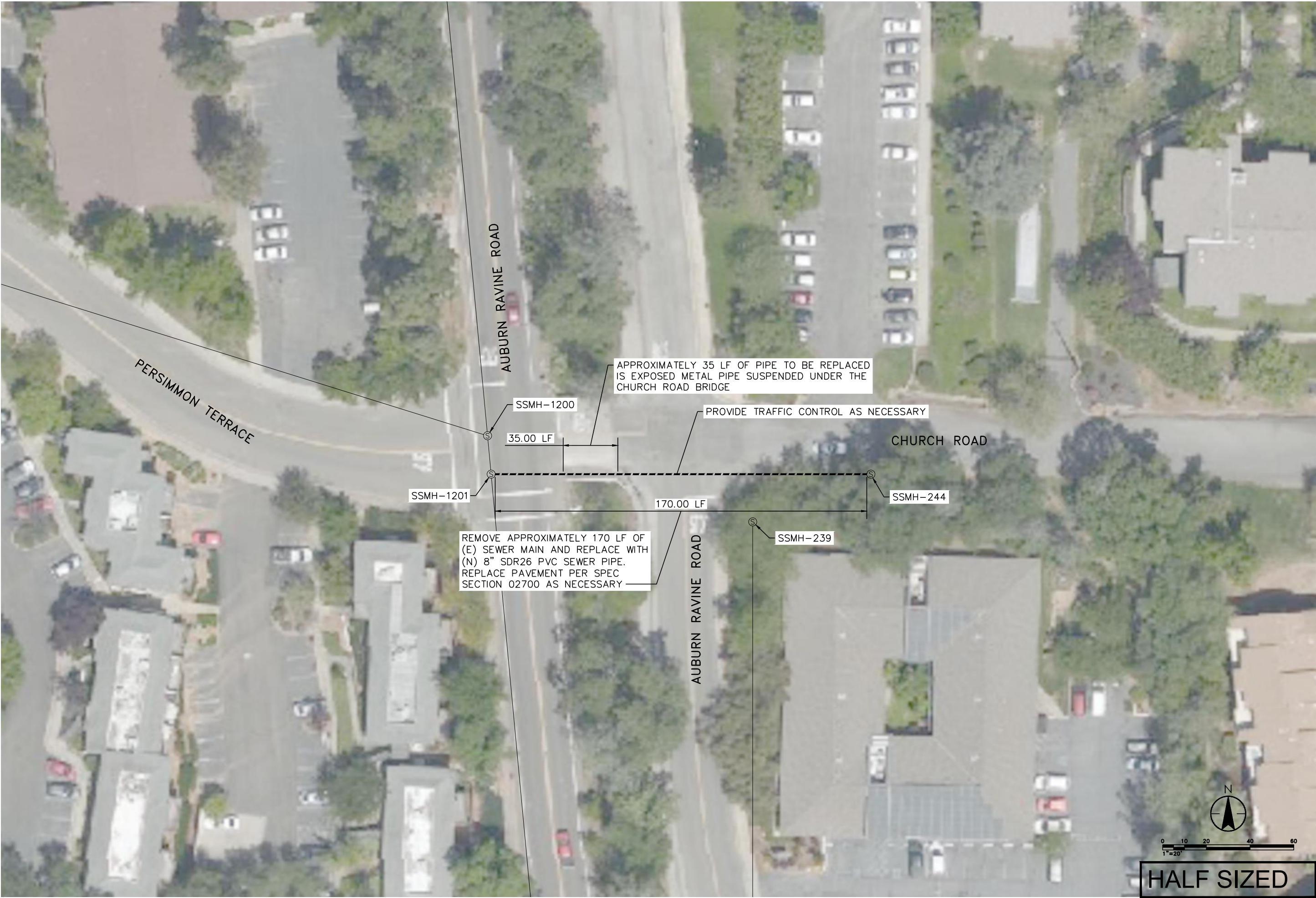
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DESIGNED BY: JR
CHECKED BY: DR

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DRAWING NO:
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7 OF 13 SHEETS

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AT FULL SCALE

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NEXGEN UTILITY MANAGEMENT

4010 LENNANE DRIVE
SACRAMENTO, CA 95834
916.564.8000

NEXGEN

CITY OF AUBURN

AUBURN 2021 SEWER
IMPROVEMENTS PROJECT

PLACER COUNTY, CALIFORNIA

CHURCH ROAD
SEWER REPLACEMENT

DATE: 3/31/2022
SCALE: 1"=20'
DRAWN BY: JA
DESIGNED BY: JR
CHECKED BY: DR

JOB NO: -

DRAWING NO:
C008

8 OF 13 SHEETS

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NEXGEN UTILITY MANAGEMENT

4010 LENNANE DRIVE
SACRAMENTO, CA 95834
916.564.8000

NEXGEN

CITY OF AUBURN

AUBURN 2021 SEWER
IMPROVEMENTS PROJECT

PLACER COUNTY, CALIFORNIA

HERRINGTON DRIVE
SEWER REPLACEMENT

DATE: 3/31/2022
SCALE: 1"=20'
DRAWN BY: JA
DESIGNED BY: JR
CHECKED BY: DR

JOB NO: -

DRAWING NO:
C009

9 OF 13 SHEETS

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NEXGEN UTILITY MANAGEMENT

4010 LENNANE DRIVE
SACRAMENTO, CA 95834
916.564.8000

NEXGEN

CITY OF AUBURN

AUBURN 2021 SEWER
IMPROVEMENTS PROJECT

PLACER COUNTY, CALIFORNIA

SACRAMENTO STREET/FOREST
COURT SEWER CIPP

DATE: 3/31/2022

SCALE: 1"=40'

DRAWN BY: JA

DESIGNED BY: JR

CHECKED BY: DR

JOB NO: -

DRAWING NO:
C010

10 OF 13 SHEETS

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NOTES:

1. TWO FLEX JOINTS REQUIRED FOR VCP OUTSIDE OF SEWER MANHOLES. ONLY ONE FLEX JOINT REQUIRED FOR PVC & DIP OUTSIDE OF SEWER MANHOLES.
2. ON PRE-CAST MANHOLE BASES, THE BUILT IN JOINT CAN BE USED FOR THE FIRST FLEX JOINT.
3. ALL MANHOLES BARRELS AND CONES SHALL BE ASTM C-478.
4. FOR MANHOLES LARGER THAN 48-INCH IN DIAMETER, ADDITIONAL REDUCING CONE SECTIONS ARE REQUIRED.
5. FLAT TOPS ARE NOT ALLOWED WITHOUT PERMISSION FROM THE ENGINEER.
6. NEW CHANNELS IN THE MANHOLE BASES SHALL BE CONSTRUCTED IN THE FIELD USING NON-SHRINK GROUT AND THE FOLLOWING REQUIREMENTS AT A MINIMUM:
 - A. CHANNEL SURFACES SHALL BE FINISHED WITH A SMOOTH FINISH AND BLEND INTO THE EXISTING BASE IN A MANNER ACCEPTABLE TO THE ENGINEER.
 - B. THE EXISTING MANHOLE BASE SHALL BE BUSH-HAMMERED IN THE AREA OF THE NEW CHANNELS PRIOR TO THE CONSTRUCTION OF THE CHANNELS.
 - C. A CONCRETE BONDING AGENT SHALL BE USED IN THE AREA OF THE NEW CHANNELS TO ENSURE PROPER BONDING BETWEEN THE NEW NON-SHRINK GROUT CHANNELS AND THE EXISTING BASE.
 - D. CONTRACTOR SHALL SUBMIT SPECIFICATION SHEETS FOR REVIEW AND APPROVAL BY THE ENGINEER FOR ALL MATERIALS TO BE USED IN THE CONSTRUCTION OF THIS SPECIFIC CHANNEL. ALL SUBMITTALS MUST BE SUBMITTED THROUGH THE PROJECT DESIGN ENGINEER.
 - E. NO DEBRIS FROM CHANNEL CREATION SHALL BE ALLOWED TO FALL IN TO THE ACTIVE FLOW.
7. BACKFILL MATERIAL AROUND SEWER MANHOLES AND OTHER SANITARY SEWER STRUCTURES THAT MUST REMAIN WATERTIGHT SHALL BE COMPACTED WITH RAMMER COMPACTORS ("WHACKER" TYPE). HEAVY EQUIPMENT SHALL NOT BE USED TO COMPACT AROUND THESE STRUCTURE UNLESS SPECIFICALLY APPROVED BY THE ENGINEER IN WRITING. BACKFILL SHALL BE PLACED UNIFORMLY AROUND THE CIRCUMFERENCE OF THE STRUCTURE IN 8-INCH LIFTS.
8. PRIOR TO INSTALLATION OF ANY SANITARY SEWER FACILITIES THE CONTRACTOR SHALL PROVIDE TO THE DESIGN ENGINEER FOR REVIEW AND APPROVAL MATERIAL SUBMITTALS FOR THE COMPONENTS VERIFYING THAT THEY MEET CITY OF AUBURN REQUIREMENTS AND SPECIFIC PROJECT REQUIREMENTS. THE MATERIAL SUBMITTALS SHALL INCLUDE, BUT NOT LIMITED TO, MANHOLES, PIPING, LIFT STATION COMPONENTS, UNDERGROUND STORAGE TANKS AND APPURTENANCES, ETC. THEY SHALL PROPERLY IDENTIFY WHICH FACILITY THE ITEM PERTAINS TO ON THE PROJECT PLANS (E.G. FROM THE PRECAST MANUFACTURER FOR ALL PRECAST MANHOLE BASES). AFTER DESIGN ENGINEER REVIEW AND APPROVAL OF THE SUBMITTALS A COPY SHALL BE SENT TO THE ENGINEER FOR FINAL REVIEW AND ACCEPTANCE. ONCE ACCEPTED, COPIES SHALL BE RETURNED TO THE CONTRACTOR. THE CONTRACTOR SHALL NOT START INSTALLATION OF THE APPLICABLE SANITARY SEWER FACILITIES UNTIL THE CITY INSPECTOR HAS VERIFIED ALL COMPONENTS DELIVERED TO THE PROJECT SITE CONFORM TO THE APPROVED MATERIAL SUBMITTALS.
9. PRECAST MANHOLE BASES REQUIRE THE HORIZONTAL ALIGNMENT OF A SEWER LINE AT THE MANHOLE TO MATCH THE PRECAST BASE WITHIN A TOLERANCE OF ± 4 DEGREES.
10. MANHOLES SHALL BE WATER-TIGHT STRUCTURES CONSTRUCTED BY PLACING PRECAST CONCRETE SECTIONS ON A POURED CONCRETE BASE OR A PRECAST MANHOLE BASE. PRECAST MANHOLE BASES SHALL ONLY BE ALLOWED WHERE PRECAST DIRECTION GEOMETRY MATCHES ALL INCOMING AND OUTGOING LINES BY ± 4 DEGREES.
11. MANHOLES SHALL BE TESTED PER THE REQUIREMENTS OF THE PROJECT TECHNICAL SPECIFICATIONS.
12. FOR ALL FORCE MAIN, LOW PRESSURE AND GRAVITY SEWER PIPING SYSTEMS INSTALL SOLID INSULATED #10 THHN SOFT DRAWN COPPER WIRE. THE WIRE SHALL BE TAPED CONTINUOUSLY TO THE TOP OF THE PIPE AND ACCESSIBLE AT MANHOLES (PLATE SS-02), VALVE BOXES (PLATE SS-22), SEWER LATERAL CLEANOUTS (PLATES SS-12 & SS-13), FLUSHING BRANCHES (PLATE SS-14), AND SEWER SERVICE CONNECTIONS (PLATE SS-10).

**STANDARD SANITARY
SEWER MANHOLE NOTES**

SS-01

DIAMETER t_{MIN}

48"	5"
60"	6"
72"	7"

MH WALL THICKNESS TABLE

STANDARD FRAME AND COVER

12" MAX.

24"

30" - 36"

TRACER WIRE

SMOOTH ALL JOINTS & EDGES WITH MORTAR INSIDE & OUTSIDE

DIAMETER

t_{MIN}

SEE TABLE

RAM-NEK GASKETS OR EQUIVALENT BETWEEN PRE-CAST SECTIONS

SEE DETAIL A

24" MAX.

12" TO 18"

TRACER WIRE TO WRAP AROUND SSMH & TIE INTO THE TRACER WIRE GOING TO FRAME

DIP

FLEX JOINTS

SEE PLATE SS-01

8" CLASS 2 A.B. @ 95% RELATIVE COMPACTION

SECTION A-A CAST-IN-PLACE BASE

12" MAX.

SHELF

8" MIN.

CONCRETE (SIX SACK MIX) (TYP.)

OUTSIDE DIAMETER OF PIPE

4"

8" CLASS 2 A.B. @ 95% RELATIVE COMPACTION

SECTION A-A PRECAST BASE

8"

STANDARD MANHOLE DETAIL

SEE PLATE SS-01 FOR NOTES

ABOVE 2,000 FT. ELEV. SET 1/2" BELOW GRADE.

12" MIN.

12"

CLASS A SIX SACK CONCRETE TYP.

IN PAVED AREAS

6" MIN.

SLOPE

12" MIN.

IN EASEMENTS (NO PAVEMENT)

FRAME AND COVER DETAILS

STANDARD SANITARY SEWER MANHOLE

DETAIL "A"

GASKET MATERIAL

3" TYP.

NON-SHRINK GROUT 1/2" THICK

NOTES:

1. FRAME AND COVER BEARING SURFACES MACHINED TO ASSURE INTERCHANGEABILITY AND CLOSE, QUIET FIT.
2. CASTINGS DIPPED IN BLACK BITUMINOUS PAINT.
3. ALL MATERIAL USED IN MANUFACTURING SHALL CONFORM TO ASTM SPECIFICATIONS A159-64T-G3000, 48-30, OR OF UNITED STATES GOVERNMENT SPECIFICATIONS Q01-653.
4. FRAME AND COVER EXCEEDS H-20 WHEEL LOADING.
APPROX. WEIGHTS:
FRAME - 140 LBS.
COVER - 130 LBS. MIN.
5. WHEN BOLT DOWN MANHOLE LIDS ARE SPECIFIED, USE D&L SUPPLY, A-1024 BOLT DOWN/WATER TIGHT MANHOLE RING AND COVER OR EQUAL.
6. SEE PLATE SS-01 FOR STANDARD NOTES

SANITARY SEWER

ASTM GRID PATTERN

1 1/2" OPEN PICK HOLE

26 1/4"

25 3/8"

25 5/16"

1 1/2"

1/32"

1 1/8"

1 3/8"

TAPERED LID

4 1/2"

24"

31 1/2"

9/16"

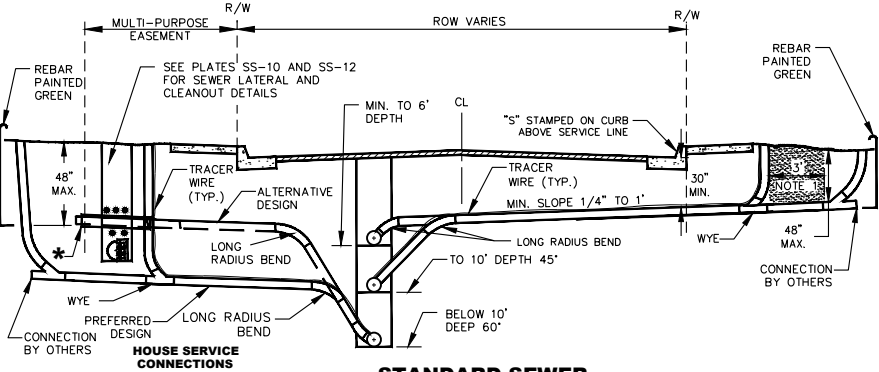
**STANDARD 24" SANITARY SEWER
MANHOLE - FRAME AND COVER**

SS-06

NOTES:

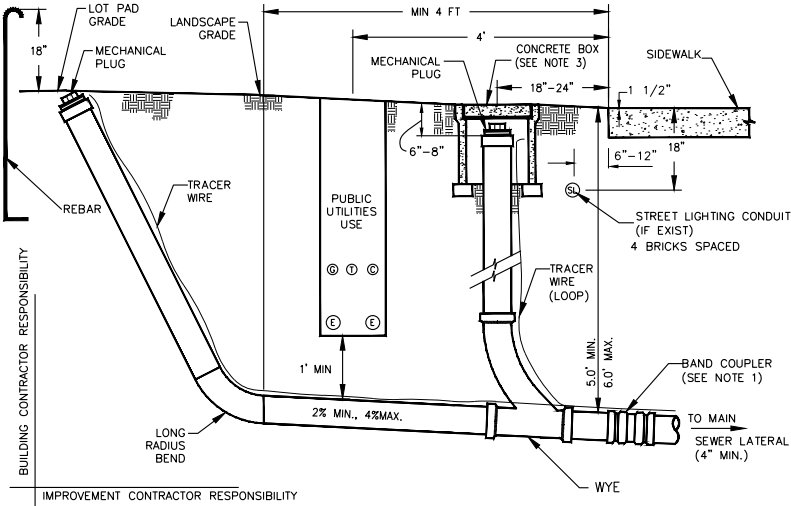
1. IN ROCK CONDITION EXCAVATE TRENCH 3 FT. BEYOND END OF PIPE. BACKFILL WITH NATIVE MATERIAL WITH ALL ROCKS OVER 3 IN. REMOVED (SEE SHADED AREA).
2. EXTEND SEWER SERVICE PAST ALL MULTI-PURPOSE UTILITY EASEMENTS.
3. STATE DEPARTMENT OF HEALTH SERVICES CRITERIA FOR SEPARATION OF WATER MAINS AND SANITARY SEWERS SHALL APPLY.
4. ALL SERVICES AND CLEANOUTS SHALL BE INSTALLED WITH A MECHANICAL PLUG AND A G05 TYPE TRAFFIC BOX. CAP TO BE WITHIN 6" TO 12" OF THE BOX LID.
5. ONLY LONG RADIUS BENDS SHALL BE USED ON SERVICE CONNECTIONS.
6. ALL SEWER SERVICE WYES SHALL ONLY BE INSTALLED AT 30° ABOVE HORIZONTAL [2 (TWO) OR 10 (TEN) O'CLOCK.]
7. 1/2" REBAR WITH 12" HOOK ON BOTTOM. PLACE TO SAME DEPTH AS SERVICE FL. PAINT GREEN & EXPOSE TOP 18". BEND REBAR OVER TO PROTECT SHARP END. (TYP.)

- * WHEN USING PVC:**
10' OF 6" C-900, OR STEEL, OR DIP SLEEVE.
WHEN USING VCP:
4" DIP CONNECTED TO 4" VCP.



STANDARD SEWER
SERVICE CONNECTIONS

SS-10

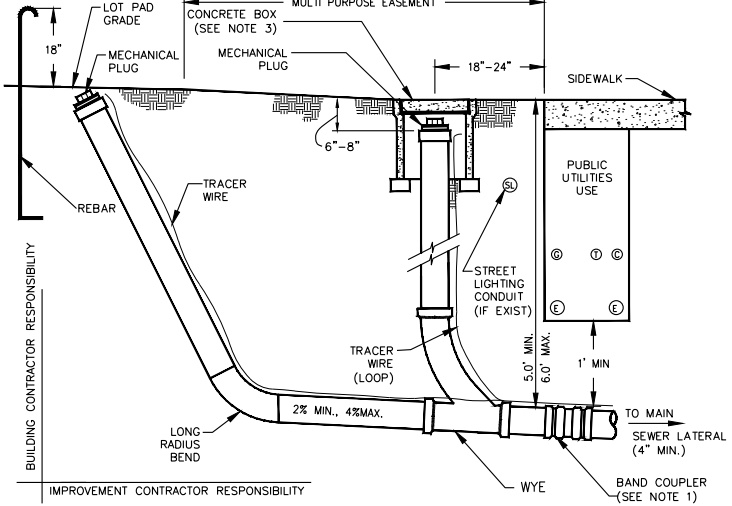


NOTES:

1. BAND COUPLER SHALL BE A FERNCO STAINLESS STEEL SHEAR COUPLER OR APPROVED EQUAL. BAND SHALL HAVE A MINIMUM OF 4 LOCKING BAND STRAPS.
2. CLEANOUT AND SERVICE MATERIALS SHALL BE ALL ABS OR ALL PVC. WYE AT PUBLIC MAIN SHALL BE SAME MATERIAL AS PUBLIC LINE.
3. CONCRETE BOX WITH METAL LID
A) IN LANDSCAPED AREAS USE CHRISTY F08 WITH F08C LID MARKED "SEWER", 2" ABOVE LANDSCAPE GRADE.
B) AVOID PLACING CURB BOX IN DRIVEWAY.
C) IF PLACED IN PAVED AREAS, USE CHRISTY G05 TRAFFIC BOX MARKED "SEWER", IF APPROVED BY CITY ENGINEER.
D) ALTERNATE MAY BE USED UPON WRITTEN APPROVAL OF COUNTY ENGINEER ONLY.
E) BOXES SHALL BE PROVIDED WITHOUT KNOCK-OUTS.
4. IN AREAS WHERE SIDEWALK IS NOT MONOLITHIC WITH CURB, THE CLEANOUT SHALL BE LOCATED WITHIN 18 IN. TO 24 IN. FROM BACK OF CURB OR BACK OF STORM DRAIN WHEN THERE IS A STORM DRAIN CONFLICT.
5. JOINT TRENCH SHALL BE A MINIMUM OF 1 FOOT ABOVE THE SANITARY SEWER LATERAL.
6. CLEANOUT MATERIALS SHALL BE SAME DIAMETER AS LATERAL.
7. THE USE OF THIS DETAIL WILL BE ALLOWED WITH PRIOR APPROVAL OF THE ENGINEER.

STANDARD
SEWER LATERAL AND CLEANOUT

SS-12

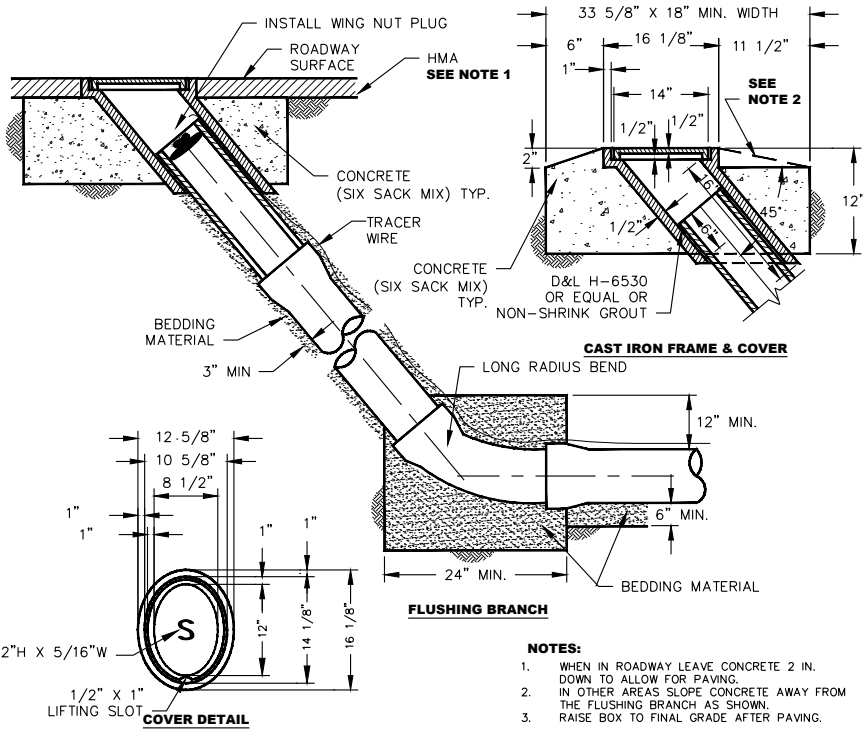


NOTES:

1. BAND COUPLER SHALL BE A FERNCO STAINLESS STEEL SHEAR COUPLER OR APPROVED EQUAL. BAND SHALL HAVE A MINIMUM OF 4 LOCKING BAND STRAPS.
2. CLEANOUT AND SERVICE MATERIALS SHALL BE ALL ABS OR ALL PVC. WYE AT PUBLIC MAIN SHALL BE SAME MATERIAL AS PUBLIC LINE.
3. CONCRETE BOX WITH METAL LID
A) IN LANDSCAPED AREAS USE CHRISTY F08 WITH F08C LID MARKED "SEWER", 2" ABOVE LANDSCAPE GRADE.
B) AVOID PLACING CURB BOX IN DRIVEWAY.
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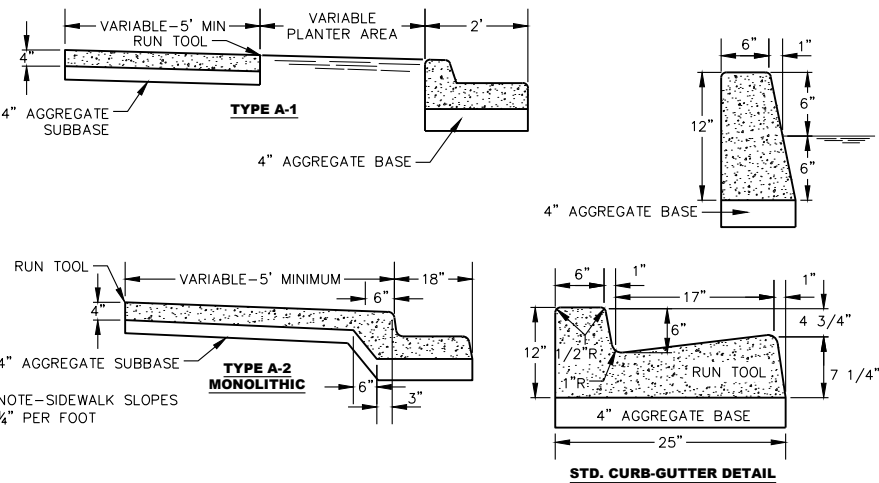
STANDARD SEWER LATERAL AND CLEANOUT
FOR JOINT TRENCH UNDER WALK

SS-13



SEWER FLUSHING BRANCH
STANDARD 45°

SS-14

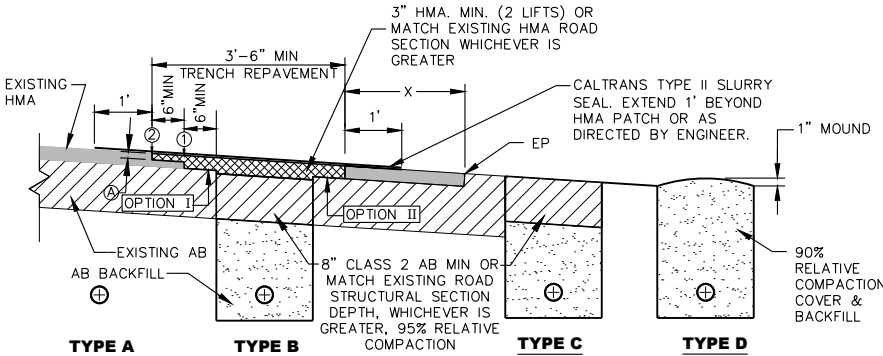


NOTES:

1. SIDEWALK SHALL BE GIVEN A TRANSVERSE SCORED TEXTURE BY DRAWING A BROOM OR BURLAP BELT ACROSS A STEEL TROWELLED FINISH. LINES SHALL BE PARALLEL AND AT RIGHT ANGLES TO THE DIRECTION OF TRAFFIC.
2. CURB-GUTTER SHALL BE GIVEN A TROWELLED FINISH. THE SURFACE SHALL FIRST BE GIVEN A FLOATED FINISH, AND A FINAL TROWELLING SHALL BE DONE WITH A STEEL TROWEL. THE FINISHED SURFACE SHALL BE FREE OF ALL TROWEL MARKS AND SHALL BE UNIFORM IN TEXTURE AND APPEARANCE, BROOM TEXTURE SHALL BE IN LONGITUDINAL DIRECTION. CURING COMPOUND TO BE APPLIED TO ALL SURFACES AFTER BROOM FINISHING.
3. SEE STANDARD DETAIL FOR EXPANSION JOINT DETAILS.

STANDARD DETAILS
CURB, GUTTER AND SIDEWALK

ST-02



LONGITUDINAL TRENCH
RESURFACING SECTIONS

U-01

BAR IS ONE INCH
AT FULL SCALE

APRVL	REVISIONS	DATE

NEXGEN UTILITY MANAGEMENT
4010 LENNANE DRIVE
SACRAMENTO, CA 95834
916.564.8000

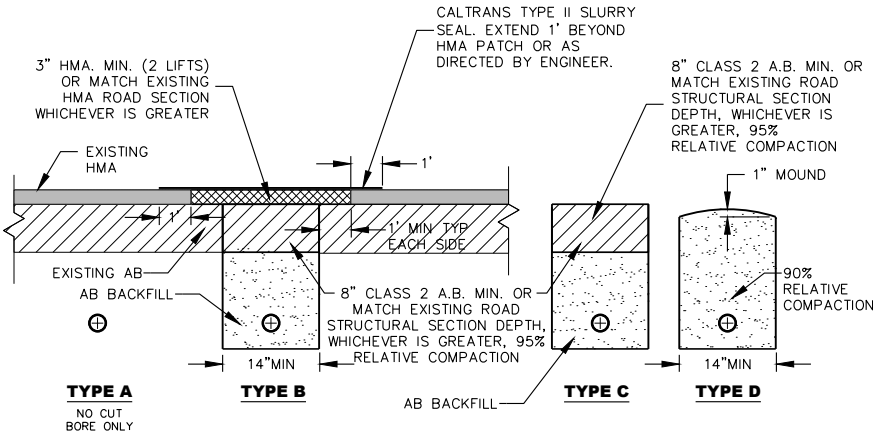


CITY OF AUBURN
AUBURN 2021 SEWER
IMPROVEMENTS PROJECT
PLACER COUNTY, CALIFORNIA

STANDARD DETAILS II

DATE: 3/31/2022
SCALE: NONE
DRAWN BY: JA
DESIGNED BY: JR
CHECKED BY: DR

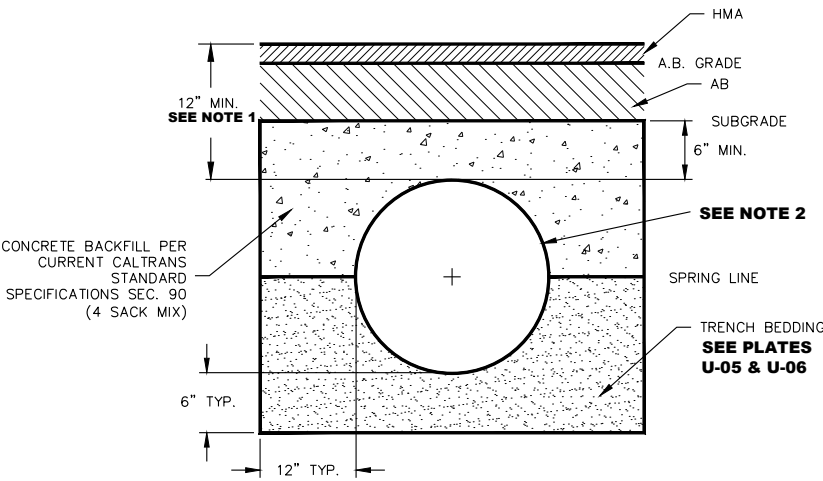
JOB NO: -
DRAWING NO:
C012



- TYPE A:** PAVEMENT SURFACES LESS THAN 5 YEARS OLD, SURFACE TREATMENTS LESS THAN 3 YEARS OLD, & MAJOR THOROUGHFARES WITH HIGH QUALITY RIDING SURFACES, BORING OR JACKING ONLY. NO PAVEMENT CUTTING PERMITTED.
- TYPE B:** PAVEMENT GREATER THAN 5 YEARS OLD
- TYPE C:** UNSURFACED ROAD SHOULDER OR OTHER AREAS SUBJECT TO TRAFFIC LOADS
- TYPE D:** OUTSIDE ROADWAY, NOT SUBJECT TO TRAFFIC LOADS
- NOTES:**
- SEE PLATES U-05, U-06 AND SD-11 FOR APPLICABLE TRENCH, BACKFILL, AND COMPACTION REQUIREMENTS.
 - WHERE OPEN-GRADE OR OTHER SPECIALIZED HMA/SURFACE TREATMENT IS PRESENT, RESTORATION REQUIREMENTS WILL BE DETERMINED BY ENGINEER.
 - WHERE GEOTEXTILE FABRIC IS PRESENT, RESTORATION REQUIREMENTS WILL BE DETERMINED BY ENGINEER.

TRANSVERSE TRENCH
RESURFACING SECTIONS

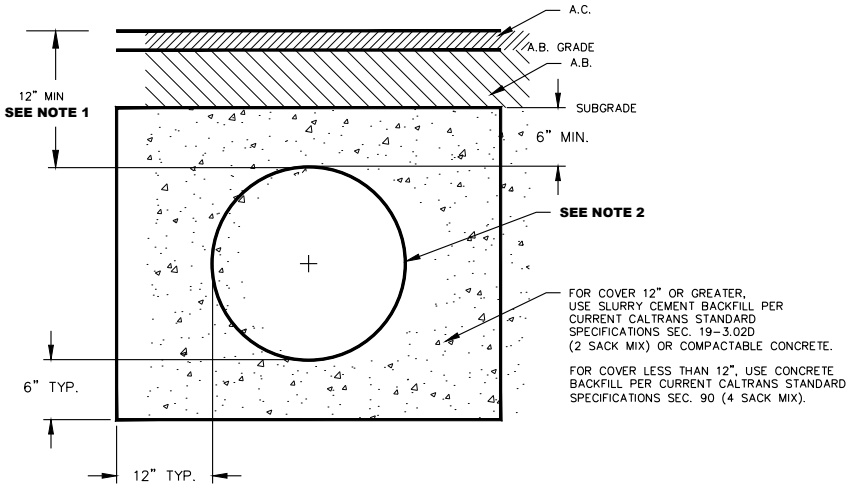
U-02



- NOTES:**
- PROVIDE MINIMUM COVER TO ACCOMMODATE STRUCTURAL SECTION REQUIRED PER THE COUNTY.
 - IF CONCRETE BONDING TO PIPE IS A CONCERN, WRAP ENTIRE PIPE WITH MINIMUM 10 MIL POLYETHYLENE SHEETING TO PREVENT BONDING.
 - CONCRETE CAP SHALL NOT BE ALLOWED WITHIN 5' OF A FLEX JOINT IN A SEWER PIPELINE.

CONCRETE CAP FOR PIPES
HAVING LESS THAN MINIMUM COVER

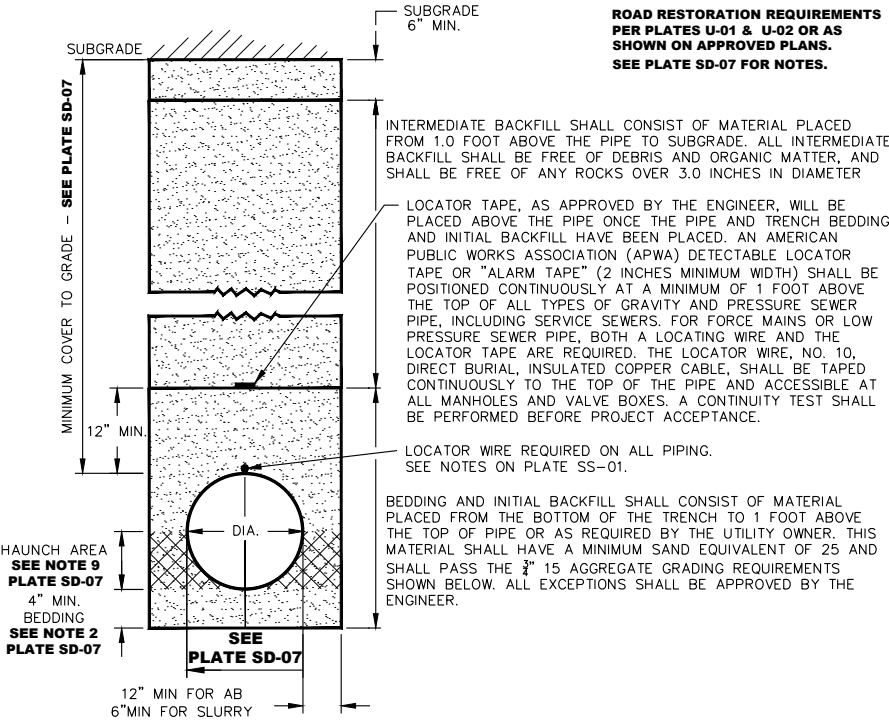
U-03



- NOTES:**
- PROVIDE MINIMUM COVER SUCH THAT FULL DESIGN A.C. LAYER PROVIDED AND AT LEAST 0.20 FT. OF A.B. TO ALLOW FOR GROUNDWATER FLOW OVER PIPE (i.e. TO PREVENT HYDROSTATIC PRESSURE BUILD-UP UNDER PAVEMENT).
 - IF CONCRETE BONDING TO PIPE IS A CONCERN, WRAP ENTIRE PIPE WITH MINIMUM 10 MIL PLASTIC TO PREVENT BONDING.
 - CONCRETE ENCASEMENT SHALL NOT BE ALLOWED WITHIN 5' OF A FLEX JOINT IN A SEWER PIPELINE.

CONCRETE ENCASEMENT
FOR PIPES

U-04



**ROAD RESTORATION REQUIREMENTS
PER PLATES U-01 & U-02 OR AS
SHOWN ON APPROVED PLANS.
SEE PLATE SD-07 FOR NOTES.**

INTERMEDIATE BACKFILL SHALL CONSIST OF MATERIAL PLACED FROM 1.0 FOOT ABOVE THE PIPE TO SUBGRADE. ALL INTERMEDIATE BACKFILL SHALL BE FREE OF DEBRIS AND ORGANIC MATTER, AND SHALL BE FREE OF ANY ROCKS OVER 3.0 INCHES IN DIAMETER

LOCATOR TAPE, AS APPROVED BY THE ENGINEER, WILL BE PLACED ABOVE THE PIPE ONCE THE PIPE AND TRENCH BEDDING AND INITIAL BACKFILL HAVE BEEN PLACED. AN AMERICAN PUBLIC WORKS ASSOCIATION (APWA) DETECTABLE LOCATOR TAPE OR "ALARM TAPE" (2 INCHES MINIMUM WIDTH) SHALL BE POSITIONED CONTINUOUSLY AT A MINIMUM OF 1 FOOT ABOVE THE TOP OF ALL TYPES OF GRAVITY AND PRESSURE SEWER PIPE, INCLUDING SERVICE SEWERS. FOR FORCE MAINS OR LOW PRESSURE SEWER PIPE, BOTH A LOCATING WIRE AND THE LOCATOR TAPE ARE REQUIRED. THE LOCATOR WIRE, NO. 10, DIRECT BURIAL, INSULATED COPPER CABLE, SHALL BE TAPED CONTINUOUSLY TO THE TOP OF THE PIPE AND ACCESSIBLE AT ALL MANHOLES AND VALVE BOXES. A CONTINUITY TEST SHALL BE PERFORMED BEFORE PROJECT ACCEPTANCE.

LOCATOR WIRE REQUIRED ON ALL PIPING.
SEE NOTES ON PLATE SS-01.

BEDDING AND INITIAL BACKFILL SHALL CONSIST OF MATERIAL PLACED FROM THE BOTTOM OF THE TRENCH TO 1 FOOT ABOVE THE TOP OF PIPE OR AS REQUIRED BY THE UTILITY OWNER. THIS MATERIAL SHALL HAVE A MINIMUM SAND EQUIVALENT OF 25 AND SHALL PASS THE $\frac{3}{4}$ " 15 AGGREGATE GRADING REQUIREMENTS SHOWN BELOW. ALL EXCEPTIONS SHALL BE APPROVED BY THE ENGINEER.

TRENCH EXCAVATION
AND BACKFILL

U-05

- NOTES:**
- UNLESS OTHERWISE APPROVED, MINIMUM COVERAGE FROM TOP OF PIPE TO FINISH GRADE SHALL BE AS FOLLOWS:

SEWER	36 IN.
WATER	30 IN.
CULVERTS	18 IN.
STORM DRAINS	18 IN.
OTHER UTILITIES	30 IN.
 - IN WET OR ROCKY MATERIAL, THE DEPTH OF TRENCH BEDDING SHALL BE INCREASED TO THE LARGER OF EITHER 6 IN. OR 1/4 DIA.
 - FOR CULVERTS/STORM DRAINS, THE MINIMUM DISTANCE BETWEEN THE SIDE OF THE TRENCH AND THE SIDE OF THE PIPE SHALL BE 12 IN.
 - MINIMUM COMPACTION REQUIREMENTS (SEE SECTION XX-XX OF THE CITY GENERAL SPECS).

A. WITHIN ROADWAY PRISM-	
BEDDING/INITIAL BACKFILL	95%
INTERMEDIATE BACKFILL	92%
B. OUTSIDE ROADWAY PRISM-	
BEDDING/INITIAL BACKFILL	90%
INTERMEDIATE BACKFILL	90%
 - IN AREAS WITH MINIMUM COVER, INTERMEDIATE BACKFILL SHALL BE CLASS 2 AGGREGATE BASE.
 - IN AREAS OF NATURAL VEGETATION OR LANDSCAPING, REMOVE TOP 12 IN. OF MATERIAL, STOCKPILE & REPLACE IN A MOUND PER PLATE U-01, TYPE D AND PLATE U-02, TYPE D.
 - ALL LANDSCAPING CONDUITS WITHIN THE ROADWAY PRISM AND/OR TRAFFIC AREAS MUST HAVE MINIMUM OF 30 INCHES COVER. MINIMUM COVER WITHIN COUNTY R/W BUT OUTSIDE THE ROADWAY AND TRAFFIC AREAS SHALL BE AS FOLLOWS:

LOW VOLTAGE ELECTRICAL CONDUITS	24 IN. MIN
PRESSURIZED WATERLINES	24 IN. MIN
NONPRESSURIZED (DISCHARGED) LATERALS	12 IN. MIN
 - COMPACTION TESTING WITHIN THE PIPE ZONE (BOTTOM OF TRENCH TO 12 IN. ABOVE CONDUIT(S)) SHALL BE PERFORMED BY TESTING LAB AS APPROVED BY THE COUNTY OR DONE BY THE COUNTY AND REIMBURSED BY THE APPLICABLE DEVELOPER OR UTILITY COMPANY.
 - SHOVEL SLICE BEDDING MATERIAL UNIFORMLY UNDER PIPE IN HAUNCH AREA. SHOVEL SLICING SHALL BE COMPLETED BEFORE THE BEDDING IS BROUGHT UP TO THE PIPE SPRINGLINE AND PREFERABLY WHEN IT IS NO HIGHER THAN THE QUARTER POINT OF THE PIPE.

TRENCH EXCAVATION
AND BACKFILL - NOTES

U-06

BAR IS ONE INCH
AT FULL SCALE

APR'L

REVISIONS

DATE

NEXGEN UTILITY MANAGEMENT

4010 LENNANE DRIVE
SACRAMENTO, CA 95834
916.564.8000



CITY OF AUBURN

AUBURN 2021 SEWER
IMPROVEMENTS PROJECT

PLACER COUNTY, CALIFORNIA

STANDARD DETAILS III

DATE: 3/31/2022
SCALE: NONE
DRAWN BY: JA
DESIGNED BY: JR
CHECKED BY: DR

JOB NO: -

DRAWING NO:
C013

13 OF 13 SHEETS